NSW Generation Investment Outlook

August 2025

Important notice

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VERSION CONTROL

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1.0	11 August 2025	n/a

Foreword from our CEO

As the Consumer Trustee under the NSW Electricity Infrastructure Roadmap, we are responsible for bridging government policy ambition with industry action, ensuring the transition happens at the pace and scale required, and in the long-term financial interests of NSW electricity customers. Our work helps build and maintain the confidence needed to attract and sustain investment in the infrastructure essential for a reliable, affordable and clean energy system.

The NSW Generation Investment Outlook (NSW GIO) is a new product designed to support this mission. Updated regularly, this report will provide a clear, data-driven view of the state's renewable energy project pipeline, identifying where progress is being made and where challenges may require collective focus and action. It is distinct but complementary to the Infrastructure Investment Objectives (IIO) report, providing a pulse check on whether the development pathway required to meet the state's targets remains achievable.

The 2025 NSW GIO shows that the development pathway set out in the 2025 IIO report is optimistic. To achieve 16 GW of renewable generation in NSW by 2030 will require projects to progress through the development pipeline approvals, financing and construction processes much faster than has been achieved in the past. Notwithstanding, we are calling on project proponents and our industry partners to help unlock opportunities for accelerated development to give rise to up to $6.8 billion in benefits to NSW electricity customers.

The NSW GIO is designed to be a practical tool for investors, policy makers and project developers. There will be opportunities to refine and improve the report over time, and we welcome industry feedback as we build this into a valuable, enduring resource for the sector.

We look forward to working with you, and the broader industry, to realise the ambition.

Nevenka Codevelle
Chief Executive Officer, ASL

Executive summary

ASL, an independent subsidiary of AEMO, is purpose built to help transform Australia's energy system. We act as a trusted intermediary between governments and the private sector, creating a bridge between policy ambitions and the action that will deliver the energy transition.

As the Consumer Trustee under the NSW Electricity Infrastructure Roadmap (NSW Roadmap), ASL plays a key role in facilitating the achievement of the NSW Government's energy infrastructure investment objectives by conducting tenders for Long-Term Energy Service Agreements (LTESAs) that encourage investment. Our comprehensive 10-year tender plan is designed to give effect to the development pathway outlined in the Infrastructure Investment Objectives Report (IIO Report), which details the infrastructure requirements needed over the next two decades to meet the government's investment targets.

While the development pathway articulates the strategic ambition for the state's energy transition, various other factors continue to influence the wider investment and project development environment. These evolving dynamics influence the degree of competition within tenders and, ultimately, impact the state's ability to fulfil its infrastructure investment objectives.

Introducing the NSW Generation Investment Outlook

The NSW Generation Investment Outlook (NSW GIO) monitors the health of the renewable generation project pipeline and provides insights into the capacity of current projects and the investment environment to meet the development pathway. This helps inform the design of tenders to encourage investment to give effect to the 2025 IIO development pathway and supports the delivery of competitive outcomes in the long-term financial interests of NSW electricity customers.

Additionally, the report also aims to provide an overview of project progression within the development pipeline, identifying stages or milestones that are more difficult to achieve or prone to delays. This analysis is expected to offer insights to assist industry participants and policymakers in developing strategies to maintain progress towards the energy transition and investment objectives.

The initial NSW GIO establishes a baseline for ongoing tracking of the project pipeline, with regular updates planned. Despite some data availability constraints affecting the preparation of this first report, we will further refine our approach based on stakeholder feedback and the ongoing enrichment of our database, enabling more robust analysis, improved assumptions and expanded analytical capabilities.

The outlook

The NSW Roadmap sets targets to encourage renewable energy investment, including the delivery of 33,600 GWh p.a. of new renewable generation capacity by the end of 2029. Since these objectives were set, 9.6 GWh p.a. of generation capacity has been constructed and a further 16 GWh p.a. secured, together contributing 76% towards the minimum objective. While this represents good progress, the momentum needs to continue. Continued and accelerated investment in renewables is essential to meet decarbonisation targets and maintain reliability as ageing coal-fired power stations retire.

A variety of factors impact the progression of new projects and their implementation timeline, including:

- community support for energy infrastructure
- the timeliness of environmental and planning approvals
- incentives to invest in renewable energy and ability to secure finance
- complexity of supply chain logistics and workforce availability
- availability of transmission infrastructure, timely construction of new transmission network and the path to generator commissioning.

There are plans in place to address many of these factors. However, NSW is building renewable generation at an unprecedented scale and unforeseen bottlenecks may emerge.

ASL as the Consumer Trustee, has set an ambitious development pathway for renewable generation. According to the 2025 IIO Report, the development pathway projects 16 GW of new generation by the end of 2029 and 29 GW by 2035 with expected benefits of $6.8 billion (net present value over 20 years) for NSW electricity customers, compared to a scenario which faces supply chain constraints and develops lower levels of generation investment. Maintaining a steady pipeline of renewable generation projects is crucial for achieving these targets and cost savings, and additional measures are required to enhance viability and timely delivery of projects.

Health of the renewable energy generation development pipeline

The NSW GIO provides valuable insights into the alignment between the development pathway and the actual progress of projects within the pipeline.

This initial NSW GIO has found there is a healthy pipeline of projects. As of May 2025, approximately 13 GW of projects in the pipeline have received development approval, with additional projects totalling 43 GW currently in the development approval process.

Nevertheless, unless the rate of project development increases, these projects may not be operational in time to keep pace with the development pathway. Should projects continue to advance at average historical lead times for wind and solar projects, the generation minimum objective may be met; however, we are likely to fall short of the ambitious development pathway. A more optimistic scenario with shorter lead times would see enough projects reaching full output to comfortably meet both the minimum objective and the development pathway.

To achieve outcomes in the long-term financial interests of NSW customers, it is essential to deliver projects quickly by removing existing roadblocks and address risks as they emerge. ASL will continue to support high-value projects through the tender process. The NSW GIO, intended for regular publication, will monitor future developments and trends regarding lead times and their impact on meeting Roadmap targets. Collaboration between industry, government, and communities will be necessary to support this significant transition.

We encourage participants to understand the flexibility of the LTESA product and seek to make use of it to help deliver projects that meet our ambitious development pathway that delivers in the long-term financial interest outcome for NSW customers.

We value your feedback

This initial NSW GIO draws on a range of publicly available datasets in addition to data from RenewMap (© 2025 RenewMap Pty Ltd, www.renewmap.com.au). The quality and robustness of the data is anticipated to increase as the NSW GIO matures. For this first NSW GIO, data gaps have been addressed using a range of assumptions and validation methods. We invite feedback regarding additional datasets that may be suitable for inclusion.

Feedback from stakeholders on all aspects of this report, including the analytical approach and any supplementary information or insights, is invited to inform future editions. Your input will contribute to the continual improvement of our analysis in response to emerging trends and new data. Information regarding the data sets used and the employed methodology is provided within the report. Please contact us at stakeholderengagement@aemoservices.com.au.

Contents

Figures

Tables

1. Introduction and scope

1.1 Achieving the NSW Government's renewable energy objectives

The Electricity Infrastructure Roadmap (the Roadmap) is the NSW Government's plan to transform the electricity system into one that provides affordable, clean and reliable energy.

The Roadmap is enabled by the *Electricity Infrastructure Investment Act 2020* (EII Act) which sets out the Infrastructure Investment Objectives that the Roadmap is intended to achieve. The Infrastructure Investment Objectives specify minimum amounts of renewable generation to be constructed by the end of 2029 (the generation minimum objective). They also require that the necessary additional infrastructure is constructed over a 20-year period to minimise costs to NSW electricity customers and meet the NSW energy security target and reliability standard.

Under the Roadmap, ASL as the Consumer Trustee must publish an Infrastructure Investment Objectives (IIO) report approximately every two years. The most recent IIO report was published on 11 August 2025.

The IIO Report is the Roadmap's central planning document. It sets out:

- a 20-year development pathway for the electricity infrastructure required to achieve the infrastructure investment objectives, and
- a 10-year tender plan for delivering the development pathway.

The 10-year tender plan gives effect to the development pathway in the IIO Report. The tender plan is intended to ensure the Infrastructure Investment Objectives are met, while fostering competitive outcomes that are in the long-term financial interests of NSW electricity customers.

Explainer: Long Term Energy Service Agreements (LTESAs)

ASL conducts tenders under the NSW Roadmap for LTESAs. LTESAs are innovative options contracts which improve certainty for investors and deliver value to energy customers.

LTESAs offer generation, long-duration storage and firming projects the right to access minimum cash flows for periods within a contract term. They are intended to be an insurance-style product, reducing price uncertainty for investors and subsequently bringing forward investment in new sources of renewable generation and storage, supporting more affordable energy for consumers.

Proponents across NSW bid for LTESAs through ASL's tender process. Projects can be located anywhere in NSW. The tenders are designed to support projects that are in the long-term financial interests of NSW electricity customers. That is, projects that can deliver price-competitive energy, be built in a timely fashion, and contribute to broader community and economic benefits.

1.2 Purpose of the NSW GIO

The NSW GIO is a new document, intended to closely monitor the health of the renewable energy project pipeline and assess how the pipeline might evolve over the next 10 years.

The NSW GIO will support our functions as Consumer Trustee under Part 6 of the EII Act by informing the the 20-year development pathway and the 10-year Tender Plan.

The development pathway in the 2025 IIO report sets out an ambitious plan for NSW's energy transition. There are many external factors that influence the ability of this plan to be realised and subsequently the number of projects that will bid for LTESAs and ultimately reach commissioning. The NSW GIO provides an additional lens to inform the tender plans and the development pathway. It also begins to track the other influences that will impact on whether we can meet the development pathway.

Stakeholders have indicated that publishing the NSW GIO would benefit the broader industry as a mechanism to inform decision making and policy development. While there are limitations with the data available for the inaugural NSW GIO, it presents a current snapshot of the project pipeline and projections of how this project cohort could progress over the next ten years. This makes the NSW GIO unique in the suite of publications that are currently available.

1.3 Scope of NSW GIO

The NSW GIO considers generation infrastructure projects that can contribute to the Infrastructure Investment Objectives. This includes renewable generation projects with a capacity greater than 30 MW that were not identified as committed or existing in a generation information page published by the Australian Energy Market Operator (AEMO) on or before 14 November 2019. The generation component of hybrid projects is also included. Hybrid projects are relatively new developments and may be included in future editions of the NSW GIO.

1.4 Structure of this report

The remainder of this report is structured as follows:

- Chapter 2 provides a snapshot of the status of the current development pipeline.
- Chapter 3 discusses the future health of the development pipeline, including the wider investment environment and projections of the future trend in pipeline development.
- Chapter 4 further explains the role of LTESAs in supporting a healthy pipeline.
- Appendix A provides further detail on how the pipeline stages have been developed and provides an explanation of our methodology for developing the pipeline projections, as well as the assumptions used.

2. Current pipeline snapshot

2.1 The future of renewables in NSW

Currently, over 50 wind and solar farms supply clean energy to homes and businesses across New South Wales, contributing around 7 GW of large-scale variable renewable energy (VRE) capacity. A further 50 projects have received planning approval, representing an additional 13 GW of generation capacity. In addition, almost 100 projects are currently in the planning approval process, with a combined capacity of 43 GW. There is also strong interest in future development, as evidenced by another 40 announced projects that have not yet commenced the planning process.

While it is recognised that some projects may not progress, or may face extensive delays, these trends suggest that the NSW Roadmap is incentivising investment in renewable energy, resulting in a healthy pipeline of projects. A certain degree of attrition remains expected and is factored into our analysis, as not every project will ultimately prove viable.

Thirteen generation projects have been awarded either an LTESA or a Capacity Investment Scheme Agreement (CISA).[1] Additional NSW projects are expected to be awarded CISAs under the current Capacity Investment Scheme (CIS) Tender 4 and LTESAs will resume for generation projects from Q2 2026.

Many projects in the development pipeline are in one of five declared NSW Renewable Energy Zones (REZs), which support a coordinated approach to developing the new infrastructure. REZs also support a coordinated approach to engaging with local communities and ensure these communities can benefit from hosting new infrastructure.

The Central-West Orana (CWO) REZ has commenced construction and is anticipated to unlock new network capacity from 2028.[2] Approximately 5.5 GW of wind and solar projects have already been awarded access rights in CWO REZ.[3] In its latest headroom assessment for CWO REZ, the Infrastructure Planner (EnergyCo) noted that future assessments may further increase the aggregate maximum capacity cap for generation and storage within the CWO REZ access rights network, which would pave the way for further investment in this REZ.[4] In South-West REZ, approximately 3.6 GW of wind and solar projects have been awarded access rights.[5]

There is a range of other factors in the broader investment environment that will influence both the likelihood and speed of renewable projects reaching final commissioning. These are discussed in chapter 3. LTESAs will also continue to have an important role to play in underwriting investment to support a healthy pipeline of projects, as discussed in chapter 4. The snapshot of the current investment pipeline provided in section 2.2 (Figure 1 and Figure 2) has been developed in a way that supports the forward-looking analysis in these later chapters.

AEMO's Quarterly Energy Dynamics (QED) and Connections Scorecard for Q2 2025 also indicate that VRE continues its upward trajectory in NSW. The QED reported an average increase in NSW large-scale VRE output of 267 MW compared to levels seen in Q2 2024.[6] NSW also saw strong growth in the connections process with 2 GW of solar and wind capacity reaching full output in the last financial year up from 1 GW in the 2023-24 financial year.[7]

1 ASL, https://aemoservices.com.au/tenders.

2 EnergyCo, Media release – Deal is sealed for Australia's first Renewable Energy Zone, 4 April 2025. This media release also notes that a total 7.14 GW was allocated when including storage as well as generation.

3 See EnergyCo website. An additional 1.7GW of access rights for storage have also been awarded.

4 EnergyCo, Central-West Orana Renewable Energy Zone: Headroom Assessment – Final Decision, January 2025.

5 See EnergyCo website. Two of these projects are hybrid projects and the access rights reflect the total amount of capacity awarded, including storage.

6 AEMO, Quarterly Energy Dynamics – Q2 2025.

7 AEMO, Connections Scorecard – June 2025 and June 2024.

2.2 A new framing of the investment pipeline

One of the key value propositions of the NSW GIO is its new characterisation of the phases in the current investment pipeline, and compilation of data that is defined by and covers all of these phases.

The definitions, methodology and data sources for the snapshot are described in Appendix A1. Figure 1 and Figure 2 provide a snapshot of key metrics for the current investment pipeline as at May 2025.

Figure 1: Current snapshot of the total capacity (GW) in the investment pipeline as of May 2025

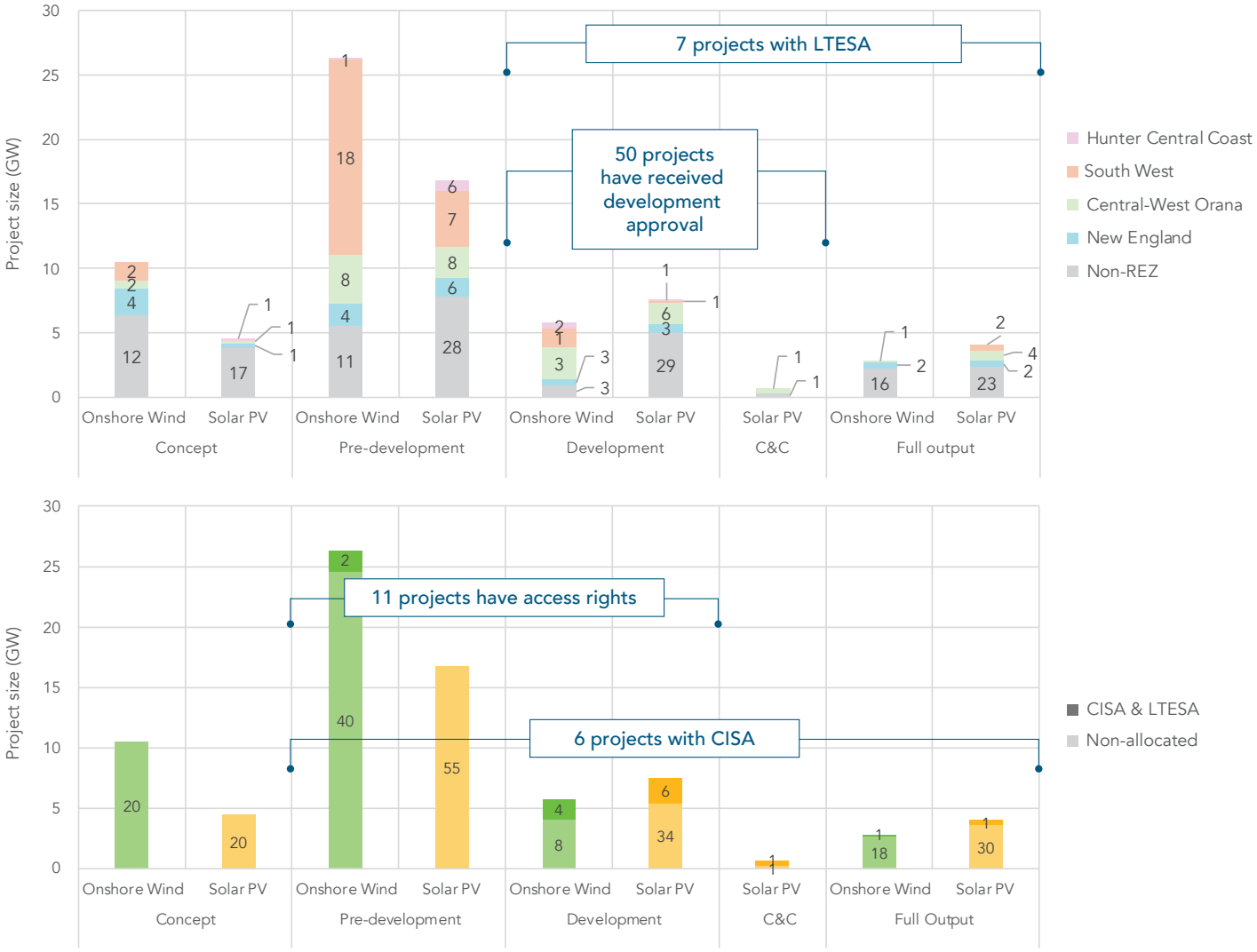


Figure explainer

The number of projects in each category is shown as a number on the bars of the chart.

CISA, LTESA and access right numbers in callout boxes reflect the ASL website. These may vary slightly from other sources, due to different approaches to aggregating across connection points.

In the bottom pane of the figure, the more lightly coloured 'Non-allocated' projects are those that have not currently been awarded a contract under a formal tender scheme. We expect that many of these projects will be awarded contracts in future tender rounds.

Projects are categorised by their pipeline stage as defined in Appendix A1. These stages do not have a one-to-one mapping with other, similar publications.

Projects that have reached full output include all projects, not just those that contribute to the minimum objective.

Figure data is ASL analysis drawing on RenewMap (© 2025 RenewMap Pty Ltd, www.renewmap.com.au), Neopoint data and a range of public sources.

Figure 2 includes the same project data as Figure 1. By displaying results geographically, it highlights that there is a spread of projects across the project development pipeline, situated across all REZs and in open access.

There is a strong pipeline of projects in the South-West REZ, particularly those in the pre-development stage. Over 15GW of capacity bid in this access scheme, however only 3.6GW were awarded access rights.[8], [9] This was part of the motivation for limiting South-West GW volumes in the future projections described in section 3. The treatment of this REZ is described in Appendix 1.3.4.

Figure 2: Snapshot of the investment pipeline by location

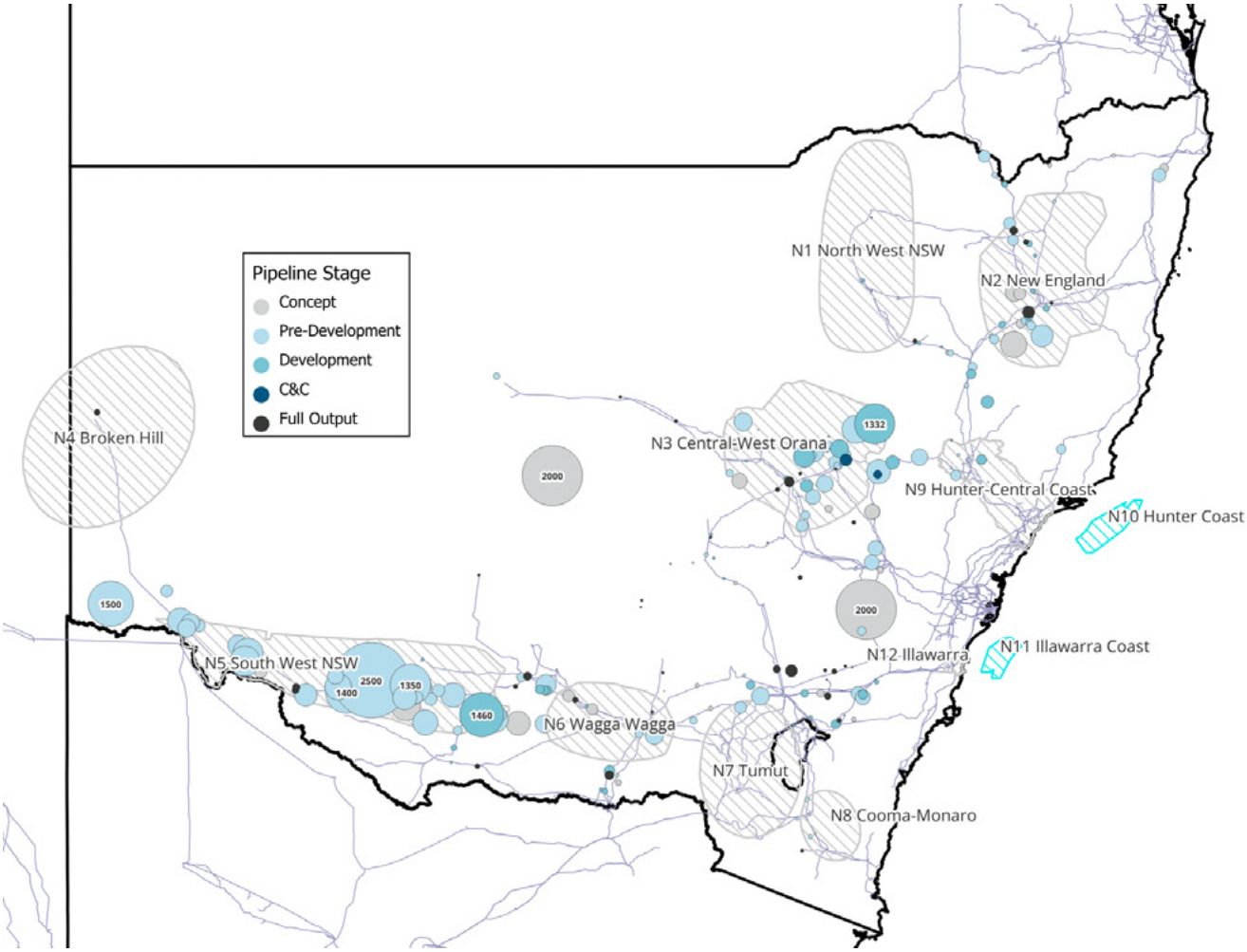


Figure explainer

The size of the circles in Figure 2 grow with the capacity size of the project.

This diagram is indicative and may not capture every generation project in the pipeline.

Figure data is ASL analysis drawing on RenewMap (© 2025 RenewMap Pty Ltd, www.renewmap.com.au), Neopoint data and a range of public sources.

8 EnergyCo, What's being built in the South West Renewable Energy Zone | EnergyCo.

9 Note that these numbers do not capture an additional 3.5GW of projects that we identified as located in the geographical South West REZ, but did not participate in the access rights tenders.

3. Future health of the investment pipeline

3.1 The investment environment presents a mixed picture, which could impact lead times

The investment environment is constantly changing due to a range of global and domestic factors, particularly technology, macroeconomic indicators and policy changes. These factors have the potential to create challenges and opportunities for renewable generation development. As noted in section 2, the estimated lead times and attrition rates provided are based on historical projects and therefore may not reflect recent investment environment conditions, including updated regulations or efforts to streamline approval processes.

This section identifies some of the current key issues influencing lead times and project viability, grouped by theme. While some concerns have been recognised for some time and may be reflected in the current estimates, others are more recent developments and not yet reflected in the available data. These issues provide important context for the pipeline projections set out in the following section.

Table 1: Key issues influencing project development

Theme	Key issues influencing project development
Community support	• Surveys (e.g. Energy Consumers Australia, CSIRO) suggest overall support for the shift to renewables but challenges in local communities that host energy infrastructure remain. Objections to projects can lead to lengthy delays and sometimes prevent a project from going ahead. • A Community Engagement Review conducted by the Australian Energy Infrastructure Commissioner in 2023 found that 92% of surveyed landholders and community members were dissatisfied with the extent to which project developers engaged the local community. • To help support community engagement, Commonwealth DCCEEW is developing a Renewable Energy Developer Rating Scheme which aims to provide greater transparency about project developers seeking to develop new energy infrastructure in communities. The NSW Government, in collaboration with NSW Farmers, have developed the NSW Renewable Energy and Transmission Landholder Guide. The NSW Government has also developed its Renewable Energy Planning Framework which, among other things, encourages meaningful consultation with communities and benefit sharing.
Planning and environmental approvals	• Concerns have previously been raised about challenges in the NSW planning process leading to delays for renewable energy projects, particularly for wind farms (e.g. Herbert Smith Freehills/Clean Energy Investor Group report). • The NSW Government introduced its Renewable Energy Planning Framework in November 2024 to, among other things, streamline the planning process, promote faster and more consistent decisions, and ensure that the level of assessment is commensurate to the risks. Guides have also been released to support developers in drafting their applications to reduce follow-up information requests. • Commonwealth DCCEEW has identified priority projects that will receive additional support to navigate the assessment process under the Commonwealth Environment Protection and Biodiversity Conservation Act. Five NSW wind and solar projects are on the priority list. • More recently, the shift to nature positive outcomes for the NSW Biodiversity Offset Scheme was legislated in March 2025. At this stage the potential impact of this development on renewable energy projects is still emerging. • The Productivity Commission is currently running inquiries into the five pillars of the Federal Government's productivity growth agenda. One of these pillars is 'Investing in cheaper, cleaner energy and the net zero transformation', which considers potential reform to 'speed up approvals for new energy infrastructure'. The final report is expected to be issued to the Government in December 2025.

Theme	Key issues influencing project development
Planning and environmental approvals	• In the Australian Energy Market Commission's (AEMC's) submission to the inquiry above, they describe modelling where wind and transmission connection delays are shown to increase residential electricity prices by ~6%. This was the most significant price impact of any of the scenarios considered by their modelling.
Financing and incentives to invest	• Banks retain significant appetite for funding renewables projects. Whilst acknowledging current low return on equity for projects, the ability to enhance return on equity will be a key driver of successful finance applications. • Historically there has been a gap between the tenor of Power Purchase Agreements (PPAs) (generally 5-10 years) and the asset life of renewable projects, making financing less attractive for banks. LTESAs and CISAs are contributing to addressing this issue by derisking the renewable energy projects they support. • The NEM Wholesale Market Settings Review is also considering changes to the wholesale contract market to address gaps in available contract tenor on an ongoing basis.
Supply chain and workforce logistics	• Road infrastructure is currently inadequate to transport large quantities of over-sized and heavy equipment, such as wind turbines, from the source (domestic location or from ports) to the project site. The NSW Government has initiated a Port to REZ program to upgrade critical roads, with the first stage focused on roads from the Port of Newcastle to the Central-West Orana and New England REZs. The NSW Government has also announced additional funding to fast-track investment in critical energy infrastructure, including REZs. • Over the last five years, the global supply chain has been impacted by global events, including Covid-19 and ongoing geopolitical uncertainties. Global demand for equipment and materials necessary to deliver the transition to net zero has increased, increasing competition and prices for resources in an already inflationary environment. Energy is also competing with other domestic infrastructure projects and data centres are increasing competition for electrical equipment. The Australian Government's Future Made in Australia fund is intended to help strengthen priority supply chains including for developing green metals and clean energy technology manufacturing. • A step up in workforce availability is required to deliver on the pipeline of renewable energy, transmission, and other large infrastructure projects. Modelling for the Integrated System Plan found that under the step change scenario an additional 33,000 workers are required by 2029, primarily for wind farms, solar farms and distributed batteries. The Australian Government has been working on a National Energy Workforce Strategy to address workforce needs. • More generally, supply chains are highly complex and in some locations are yet to be established, so it is difficult to predict what additional bottlenecks may arise as construction accelerates.
Network and connections	• REZs were developed to address concerns about transmission network availability and to coordinate generation and transmission investment. However, concerns remain regarding the availability of uncongested transmission network, and construction of new transmission has faced many of the same challenges as generation (social licence, supply chain issues, workforce availability), causing delays. • Work is ongoing to continually improve the connections process. AEMO and the Clean Energy Council's Connections Reform Initiative has delivered reforms in this area, including a rule change (commenced July 2024) to improve investment certainty in the pre-connection registered data (R1) process. More recently, the AEMC has made a new rule relating to improving access standards that is intended to lower connection costs and promote faster connections. A second package of improvements to access standards has commenced consultation. • The NSW REZ framework (gazetted 6 December 2024) allows non-negotiable REZ access standards and concurrent processing of applications to connect for the purposes of conducting power system studies to support streamlined connection in REZs with a declared access scheme. • Access schemes help address some of the issues identified above, such as supporting cost recovery for new infrastructure, reducing network congestion to provide network certainty and helping to bolster community support.

3.2 Pipeline projections suggest NSW will deliver an adequate level of generation under central and optimistic scenarios

Projections have been developed for the prospective pipeline of solar and wind projects related to the NSW Roadmap. These projections do not predict individual projects; rather, they provide an indication of the cohort of projects overall, including whether the quantity is sufficient to enable the IIO development pathway for generation and to ensure adequate competition for NSW Roadmap tenders. It is important to point out that even though we have projected the aggregate capacity of LTESA, CISA and access right holders in Figure 4, this is an unidentified cohort rather than identifying precise project information, as we have been careful to allow the model to forecast the timing of projects rather than to use project-specific confidential information.

The projections are indicative only and may be subject to revision and refinement in subsequent NSW GIOs. Several factors contribute to this, with the primary considerations outlined below:

- It is plausible that NSW is experiencing a mega cycle of renewable energy investment driven by clear policy targets and the availability of LTESAs and more recently, CISAs. This environment may have resulted in an unusually high number of projects at early development stages. Projections for this group are based on historical attrition and lead-time assumptions, which may introduce optimism into the forecasts. This is counterbalanced by including lower, central and upper scenarios. Further information is included in A1.3.
- Various factors can affect a developer's decision to invest or may lead to delays in the construction and commissioning of a project, including those related to the investment environment set out in section 3.1. As such, it is difficult to predict with any certainty whether individual projects will proceed as expected.
- The availability of data underlying this initial NSW GIO analysis reflects the growth of the renewable energy industry. Time series are relatively short, meaning historical trends are difficult to infer. Nevertheless, the processes of information collection and publication have improved over time, and we anticipate that ongoing enhancements, along with more rigorous monitoring, will contribute to increasingly robust analysis in future NSW GIOs. As Consumer Trustee, ASL is also building a rich dataset through tender processes. Although data from previous tenders cannot be used to inform the current NSW GIO, we intend to integrate additional information into future NSW Roadmap tenders wherever feasible, subject to confidentiality provisions.

In recognition of these limitations, we have developed three scenarios with different sets of assumptions to test the potential range of outcomes: lower, middle and upper. The central scenario is based on analysis of average historical outcomes. The lower and upper scenarios adopt more pessimistic and optimistic assumptions, respectively, for new project entry, lead times and attrition rates.

The resulting projections provide a relatively wide set of potential outcomes. This gap reflects both widely varying historical lead times and data limitations. These issues are discussed further in the appendix.

3.2.1 Approach to developing projections

The following approach was taken to develop the projections:

- **Establish a current snapshot of the development pipeline** by identifying the current cohort of NSW wind and solar generation projects and allocating them across each pipeline phase. This is the snapshot set out in Figure 1 and Figure 2 above.
- **Establish how many GW of new projects can be expected to enter the pipeline each year** from 2026 based on the number of new projects that entered the planning process in 2023.
- **Calculate lead times by technology type between pipeline phases** by analysing historic data and calculating the average time that projects have taken to move through each phase of the development pipeline.
- **Calculate attrition rates between pipeline phases** by analysing historic data on how many projects have formally withdrawn from the planning process or are otherwise identified as shelved based on lack of progress. For later phases, attrition rates based on AEMO's Connection Scorecard were used.
- **Establish the projections** by applying assumptions for new entrants, lead times and attrition rates to the current snapshot to produce a forecast of the NSW renewable generation project cohort over time across 4 main pipeline phases. The projections have been adjusted to remove SW REZ projects that were not granted an access right and ensuring that CWO REZ projects do not start earlier than currently announced transmission availability.[10]

10 EnergyCo, Media release – Deal is sealed for Australia's first Renewable Energy Zone, 4 April 2025.

This methodology is summarised in Figure 3. The appendix provides further detail on the methodology and assumptions used.

The approach is simplistic in that it does not impose any limits that would constrain projects from reaching full output (except for in the case of some REZ projects to ensure they don't commence prior to transmission availability). For example, the analysis does not include market modelling and so does not account for market forces that, in practice, would influence generation investment decisions and ultimately constrain the total amount of projects achieving full output over the long term.

Similarly, while delays due to supply chain constraints or other limitations, are implicitly captured in the lead times, specific limits have not been applied. Rather, the approach simply assumes the current cohort of projects will continue to progress through the development pipeline based on historic lead times and subject to historic attrition rates, with an assumed number of GW of new projects entering the pipeline each year.

The value of this analysis lies in contributing to a better understanding of whether there is a sufficient pipeline of projects that will be eligible to participate in LTESA tenders. As it also projects when projects will reach full output, it helps to estimate when the generation minimum objective may be met and how closely the build out of projects will follow the development pathway. Proponents are advised that any perceived alignment between the data and charts presented and their individual projects is purely coincidental. Measures have been taken to ensure both aggregation and anonymity. Further, the chart workbook has been provided to support a comprehensive understanding of our methodology. However, caution should be exercised to avoid interpreting the data as reflective of any commercially sensitive or confidential information.

Despite current data limitations, this first NSW GIO provides a baseline from which to monitor future trends. This will allow us to identify potential risks in the development pipeline and risks to delivering the Roadmap objectives.

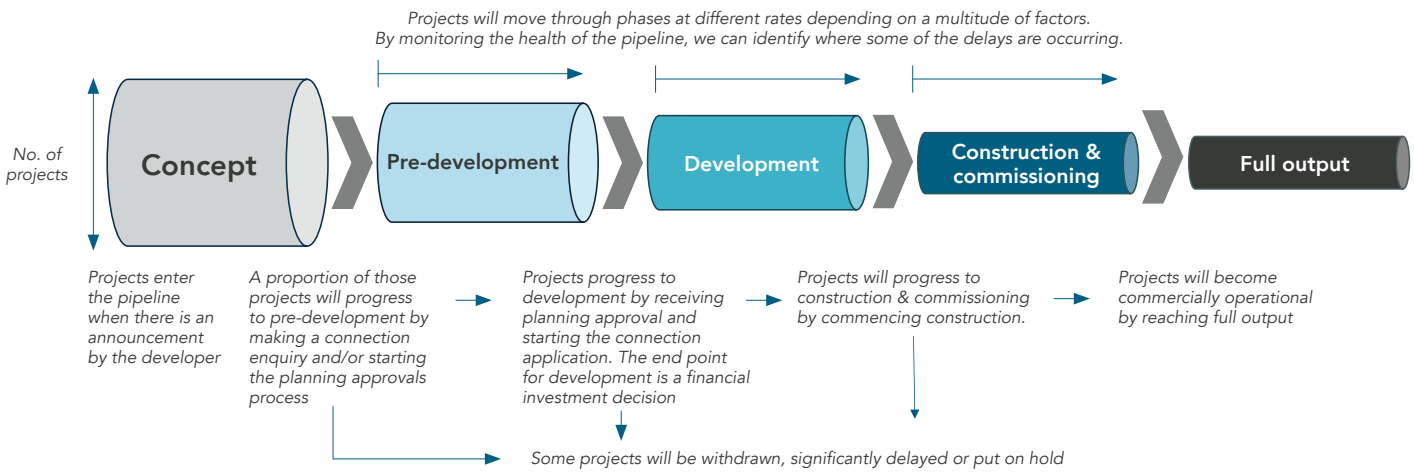
Explanation of lead times and attrition rates

Lead times provide an indication of how quickly a project might progress through each phase. The lead times have been calculated based on the average historical lead times for projects that have completed pipeline phases as well as projects that are now in operation. However, the speed at which a project will progress in practice will depend on a multitude of factors. Historical data shows there is a high level of variability between lead times for individual projects, particularly for wind generation.

Further, historical lead times may not capture recent changes in policies or other factors that may serve to speed up or potentially slow down progress. These factors are discussed in section 3.1.

Attrition rates provide an estimate of the proportion of projects that may not proceed to the next phase. The data to inform attrition rates is sparse and complex due to challenges in understanding whether a project has been abandoned or is on hold for an extended period and may resume. For the pre-development phase we based the attrition rate on projects that have been formally withdrawn from the NSW Planning or Commonwealth approvals processes. For later phases we relied on the conversion rate in AEMO's Connection Scorecard, which is the rate at which projects reduce from one connection stage to the next.

Figure 3: Methodology for developing pipeline projections



3.2.2 Pipeline projection results

Figure 4 sets out the resulting projection of projects that could reach full operation over the coming decade that contribute to the generation minimum objective. Projects are identified by whether they currently hold an access right or an LTESA or CISA, and whether they are eligible to tender for an LTESA or CISA. Where projects hold both an access right and an LTESA or CISA, we have identified them as access right holders. It is important to note that we have identified contract and access right holders not to make any specific comments about these projects' future progression. The important point to take from the chart that there is still a large cohort of projects in the pipeline that are eligible for an LTESA in addition to those that already hold contracts. Note that under the optimistic scenario the projections imply the quantum of projects coming online could exceed the generation element of the development pathway.

In practice we would expect the number of projects progressing to full output to not greatly exceed the IIO development path on the basis that this level represents wholesale prices and scheme costs that are in the long-term financial interest of NSW customers.

Figure 4: Indicative trend of GWh projected to reach full output over the next ten years that could contribute to the generation minimum objective

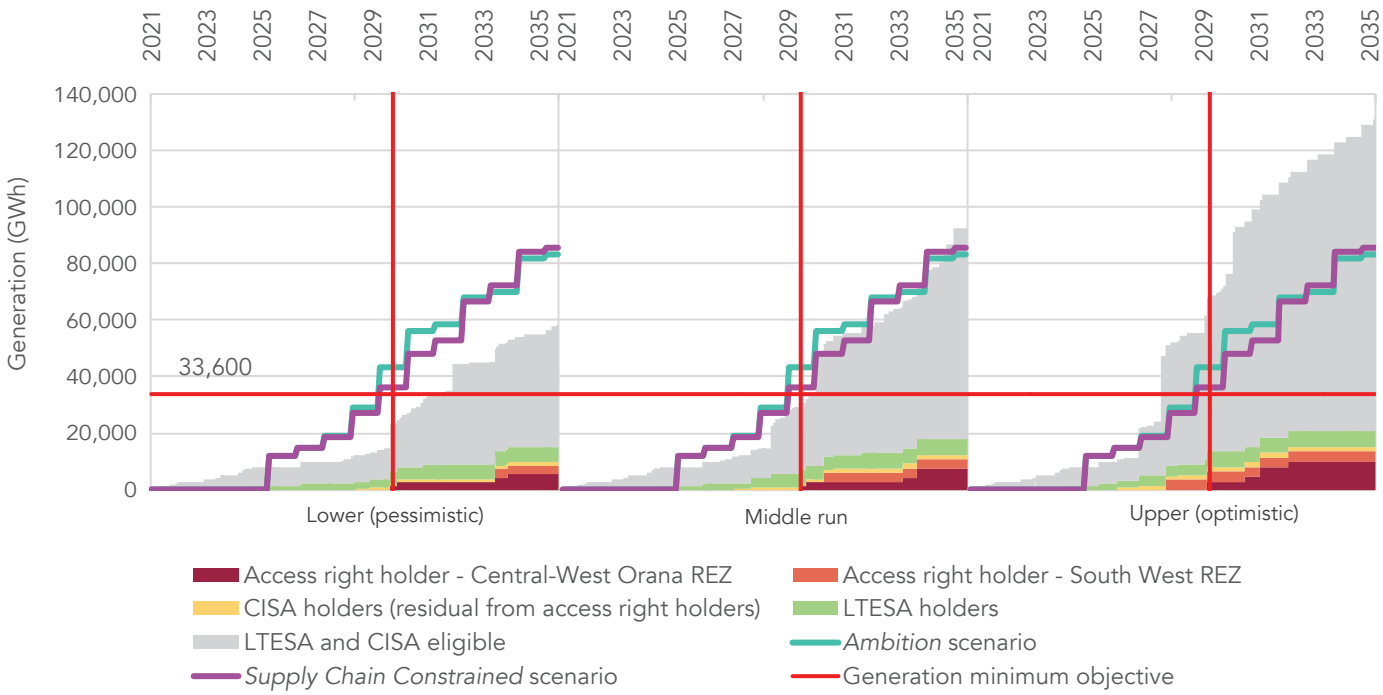


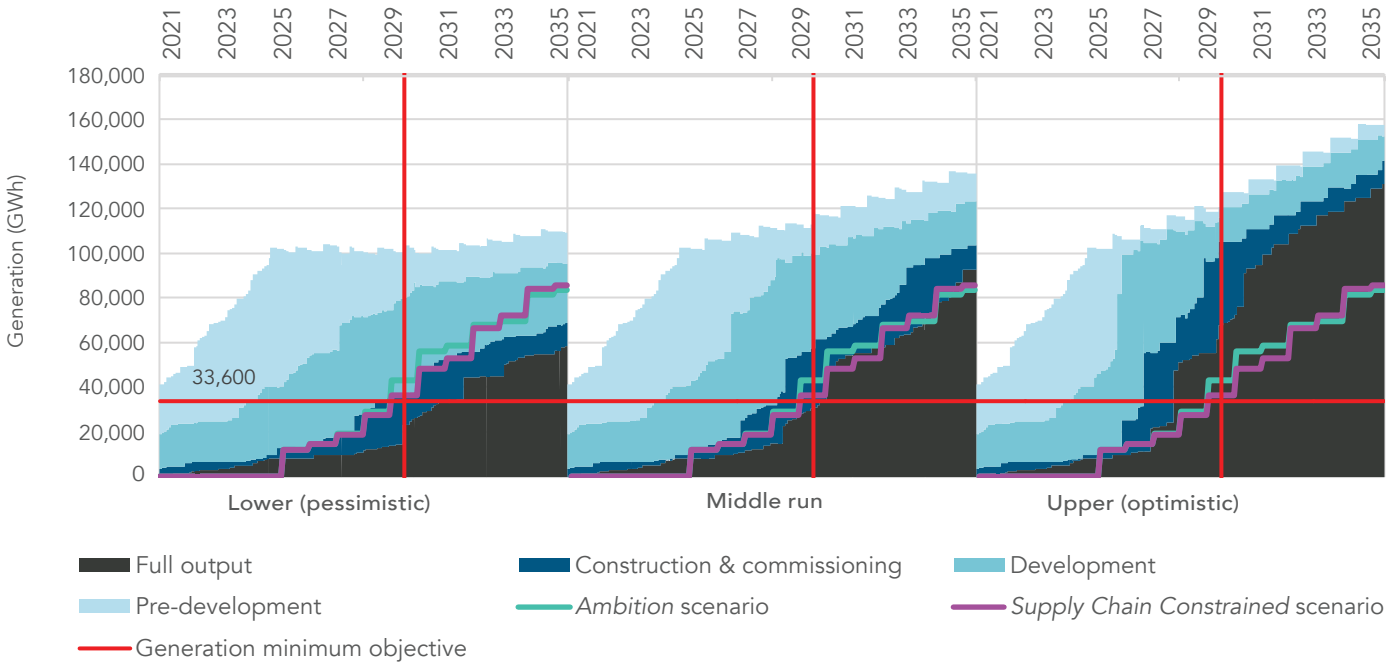
Figure explainer

As mentioned in earlier sections. These projections relate to lead time and attrition rates developed as part of the NGW GIO model. Even in the case of LTESA, CISA and Access Right Holders, we have used the lead times and attrition rates in the NSW GIO to move the projects forward rather than using any confidential data on expected commercial operating dates. To reflect information that is publicly available, the CWO REZ access right holders' project lead times were adjusted to approximately reflect the time at which the CWO REZ transmission infrastructure is currently announced as becoming available.[11]For SW REZ, projects that did not obtain an access right have not moved forward in our model. Further explanation is provided in A1.3.4.

Figure 5 below shows the projection of GWh of projects that could reach full operation, and adds in projections for the pre-development, development, and construction and commissioning phases of the development pipeline. The figure emphasises how projects shift between phases and how the project cohort as a whole tracks the development pathway – with the Ambition scenario being the development pathway as outlined in the 2025 IIO report.

11 EnergyCo, Media release – Deal is sealed for Australia's first Renewable Energy Zone, 4 April 2025.

Figure 5: Indicative trend of GWh by pipeline phase compared to the 2025 IIO report development pathway



3.2.3 Implications of the pipeline projections

ASL used the NSW GIO pipeline projections to inform its 2025 IIO report, including the development pathway and the 10-year tender plan for LTESAs. The projections provide a means to sense-check the modelled development pathway and consider whether it provides an appropriate balance between ambition and what is practically achievable.

As Figure 5 shows, the pipeline projections suggest that:

- Under the optimistic scenario there are enough projects reaching full output to achieve the ambitious development pathway and generation minimum objective (expressed in GWh) are met.
- Under the central scenario, the generation minimum objective is met. However, there are only enough projects reaching full output to meet the supply chain constrained development pathway by 2030.
- Under the pessimistic scenario, projects do not develop quickly enough to meet either the *supply chain constrained* iteration of the development pathway or the generation minimum objective.

Lead times as per the middle scenario need to at least be maintained to bring enough projects online to meet the 2030 generation minimum objective. The findings also show that unless historical lead times can be shortened, projects may not come on quickly enough to meet the ambitious development pathway. We estimate that achieving generation investment in line with the ambitious development pathway would deliver up to $6.8b in benefits to NSW electricity customers (net present value over 20 years) compared to the *supply chain constrained* iteration of the development path. For this reason, ASL has decided to adopt an ambitious development pathway.[12] This report underscores the importance of identifying and addressing existing barriers and emerging risks to generation projects.

As noted in section 3.1, there are multiple factors that could create a bottleneck in the development pipeline, from community support and planning approvals through to road infrastructure and workforce limitations. Additional, unforeseen bottlenecks may also emerge due to the complexity of supply chains and the scale of the energy transition. Industry, government and communities need to continue to work together to manage these risks and deliver outcomes at the lowest possible cost to NSW customers, building on additional support for communities, reforms, additional funding and other process that are already under way. As a counterbalance, the AEMO Connections Scorecard has just recorded 4.4 GW annual build which exceeds the recent historical NEM-wide maximum of 4 GW annual constructions. This indicates that while there are headwinds, momentum may be building across industry.

The NSW GIO will play an important role in monitoring these emerging issues and the implications for achieving the Roadmap targets. Updating the analysis regularly provides a methodical and robust means to track developments and determine the extent to which they are impacting lead times and attrition rates.

12 See ASL, 2025 Infrastructure Investment Objectives report, August 2025 for further discussion on why the *Ambition* development path was adopted.

4. The role of LTESAs in supporting NSW electricity generation infrastructure

The 2025 IIO report includes a tender plan that is set to give effect to the development pathway. The tender plan is driven by steep investment requirements to meet the 2030 minimum objective with four 7,000 GWh p.a. (around 2.5 GW) tenders across two years, followed by tenders amounting to 4,600 GWh p.a. (around 1.6 GW) each year from 2028.

LTESA tenders are proposed to re-start in Q2 2026, allowing sufficient time for participants to prepare competitive bids following the 2025 IIO Report publication and to allow for announcements from Capacity Investment Scheme (CIS) tender 4 in Q4 2025 and, if also required, CIS tender 5.

Figure 6: 2025 IIO generation 10-year tender plan

Note: CIS Tender 4 is live at the time of publishing this report and is indicated by a range reflecting possible outcomes between the minimum and maximum allocations to NSW.

Tenders for LTESAs are designed to identify high-quality projects that can deliver electricity infrastructure that is in the long-term financial interests of NSW electricity customers. High quality, well located, community supported projects are encouraged to come forward to participate, to enhance the chance of having new generation projects in place by 2030. To continue to meet minimum and overall objectives of the EII Act we encourage all high-quality projects with a range of commercial operating date timeframes to participate in tenders to maintain a pipeline of investment.

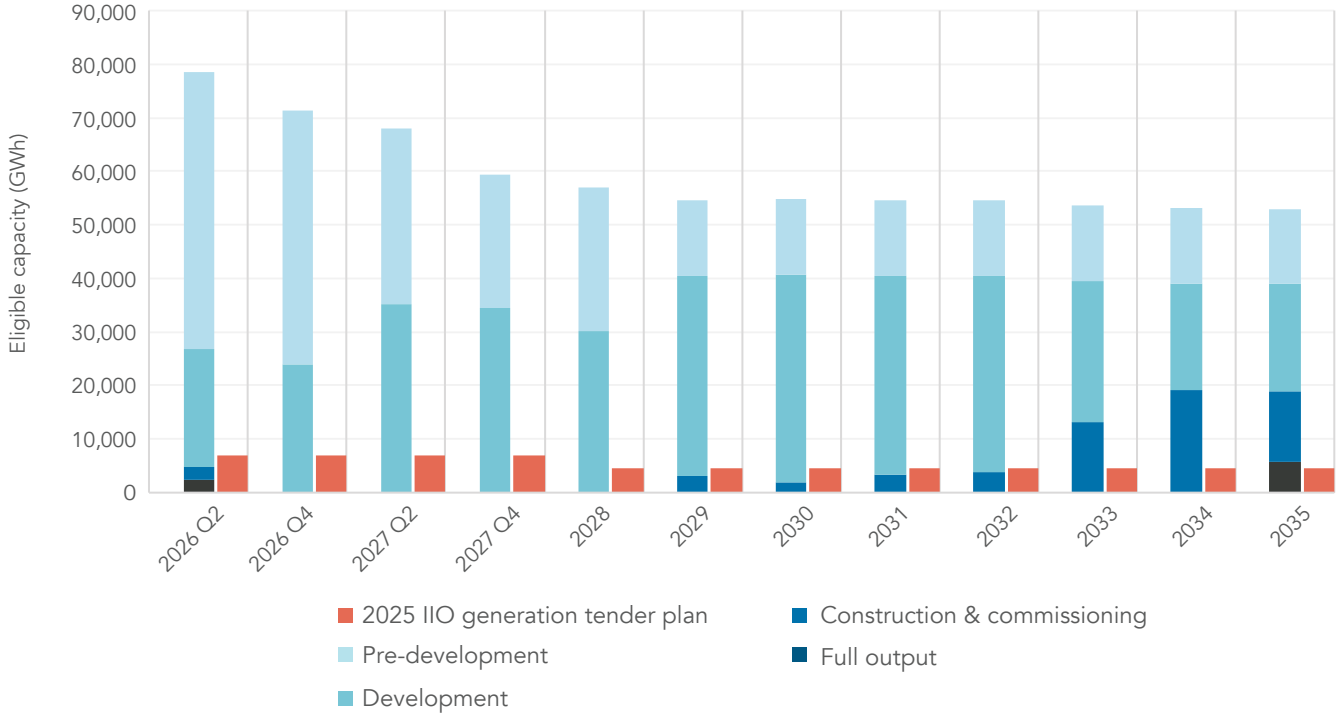
The LTESA product is key to attracting projects to NSW Roadmap tenders. Its protection against wholesale price shortfalls during operation can provide generation, long-duration storage and firming projects with the potential financial support necessary to secure private-market funding. Through competition in LTESA tenders, the market is expected to shape the mix of projects supporting our legislated investment objectives. From the perspective of the NSW GIO, most projects will be eligible to bid for a LTESA when they are in the pre-development phases, having had a response to a connection enquiry and obtained a Secretary's Environmental Assessment Requirements (SEARs).[13]

We encourage participants to understand the flexibility of the LTESA product and seek to make use of it to help deliver projects that meet our ambitious development pathway that delivers the best long term financial interest outcome for NSW customers.

The pipeline projections have been used to test the potential competitiveness of the 10-year tender plan.

13 tender-round-4-tender-guidelines.pdf

Figure 7: LTESA-eligible projects compared to the 2025 IIO generation 10-year tender plan



This chart compares the 2025 IIO generation tender plan to the amount of estimated capacity that is eligible to bid for a LTESA. It shows that across the 10-year tender plan, there are at least 10 times the number of LTESA eligible projects compared to the tender size. These figures are adjusted to remove projects that are not eligible to tender (e.g. because they already hold an LTESA or CISA or because they were existing or committed prior to November 2019). While projects may be eligible to tender, they may choose not to participate. We found that a participation rate of 20% to 35% of the cohort of eligible projects would result in the desired level of coverage for sufficient competition, defined as approximately three times the tender size.

The capacity amounts are split by development stage. The changing profile of projects by development stage across the 10-year period reflects the approach of using historical attrition and lead time rates to forecast the development of the project cohort. It shows that the quality of projects, as measured by stage of development, improves over time.

As each tender is conducted, projects are sequentially subtracted from the project stack to recognise that projects that are awarded an LTESA will no longer be eligible to tender. For the purposes of this exercise, we have assumed that the more advanced projects are awarded LTESAs, but note that in practice there are multiple factors that will determine which projects are successful.

Projects reaching full output appear as eligible for an LTESA in 2035, as the smaller tender sizes from 2028 onwards allows the project cohort to replenish such that some reach full output. The trend of projects moving from pre-development to development reflects an initial bulk of projects in pre-development stage that then steadies out due to an assumption that sets a static rate of annual generic new entrants.

A1. Methodology and assumptions

This appendix provides an overview of the data sources used to inform this report alongside the methodology used to develop the NSW GIO pipeline projections, including the underlying assumptions.

A1.1 Data sources and limitations

The NSW GIO draws on both commercial and public data sources. Commercial sources include:

- RenewMap datasets (© 2025 RenewMap Pty Ltd, www.renewmap.com.au)
- Neopoint, for identifying projects progressing through to the full output phase.

Public data sources include:

- The NSW Major Projects planning portal
- The Environment Protection and Biodiversity Conservation Act public portal, managed by the Australian Department of Climate Change, Energy, the Environment and Water
- Key Connection Information (KCI) published by AEMO
- The Connections Scorecard published by AEMO
- Generation information, published by AEMO
- NEM Registration and Exemption list, published by AEMO
- Large-scale renewable energy data published by the Clean Energy Regulator

Some of the datasets used to develop this NSW GIO are small, inconsistent or incomplete. For example, KCI has only been required to be provided to AEMO since December 2019, and AEMO has only been required to publish KCI and generation information since January 2020 (although it did publish some information before then).

More generally, the renewables industry is still relatively young. Our analysis identifies 31 solar farms, and 19 wind farms above 30 MW currently in service.[14] Particularly for wind projects, this is a relatively small sample size on which to understand lead times for reaching full operation. There have also been numerous regulatory changes and other factors that have affected project investment and development over different periods in the last 20 years, resulting in highly variable lead times.

We have necessarily had to make a number of assumptions to address gaps and other challenges identified above, while making best use of the breadth of available data sources. Internal datasets and industry knowledge have been used to validate external data and assumptions where possible.

The data sources that we use will be updated and expanded in future iterations of the NSW GIO. We expect data to become richer over time both as new projects reach completion and as the NSW GIO provides a mechanism for improved monitoring. In the future, we may also consider explicitly including de-identified internal ASL data in the NSW GIO, subject to confidentiality requirements and other provisions governing use of tender and contract management data.

14 AEMO Generation Information as at April 2025.

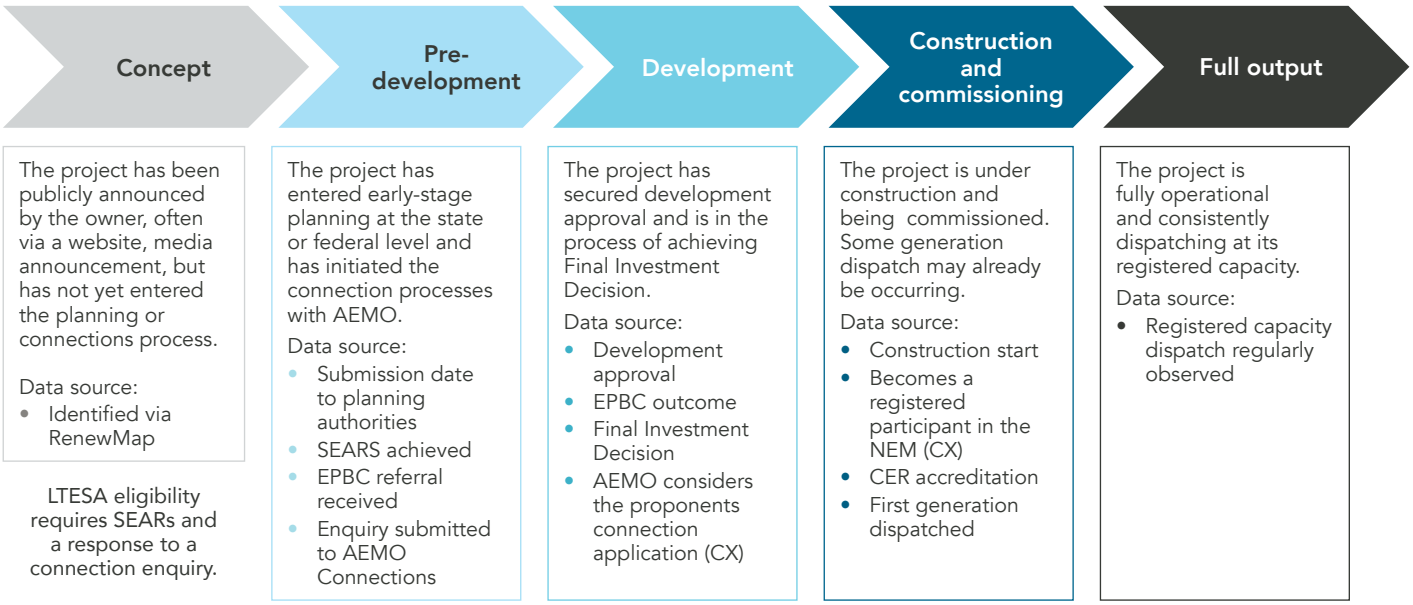
A1.2 Pipeline phases

To characterise the snapshot of the current investment pipeline, new definitions of pipeline phases were developed for this report. New definitions were necessary to utilise the breadth of available sources for project milestone data while accounting for complexities that arise across the combined suite of datasets. Examples of these complexities are:

- Generation project development involves multiple milestones that may occur concurrently, such as development and environmental approvals, grid connection and securing finance.
- Not all projects follow the same linear approach, with some milestones occurring in a different order.
- Different sources have different approaches to updating and defining their own milestones.

The NSW GIO developed its phases by analysing the data to determine the order in which most milestones are achieved for most projects. Once ordered, milestones could be allocated to phases that qualitatively describe the overall progression of a project. The phases are described in Figure 8, along with the key sources of data for each phase.

Figure 8: Definition of pipeline phases and data sources for each phase



The NSW GIO uses these phase definitions to develop a pipeline snapshot by deeming that a project has entered a new phase whenever a project first reaches any of the milestones corresponding to that phase. Given this approach, a one-to-one mapping between the GIO phases and those of other publications should not be expected.

In future iterations of the NSW GIO we hope to refine this analysis with additional milestones within phases, subject to data availability. This will allow additional granularity within phases to recognise that projects may be more or less advanced within a phase.

A1.3 Developing the pipeline projections

Section 3.2.1 provides an overview of how the NSW GIO pipeline projections were developed. The key parameters to be established were:

- How many new projects enter the pipeline each year
- Lead times for each pipeline phase
- Attrition rates for each pipeline phase.

The following sections provide further detail on how we established these assumptions.

A1.3.1 New project entry

Table 2 sets out the assumptions for the GW of new projects that enter the development pipeline each year for each scenario in the forward-looking horizon, split by wind and solar.

Table 2: Assumptions on new project entry

Scenario	Assumption (GW)	
	Wind	Solar
Lower	0.9	0.5
Central	1.4	0.7
Upper	1.8	0.9

Limited information was available to determine the number of projects that may enter the development pipeline due to data sparsity. This uncertainty necessitates the use of a standard annualised date of project entry. This also makes it difficult to determine the associated lead times and attrition rates for the concept phase. The number of new projects entering the pipeline in recent years has been volatile, motivating the use of varied new entrant assumptions by scenario.

To address these issues, the central scenario's new entrant capacity is based on the GW of projects that entered the planning approval process in 2023 and that went on to secure development approval. By only including projects that ultimately achieved development approval, this implicitly accounts for attrition in the concept phase.

The lower and upper scenarios were developed to provide a reasonable sensitivity to show potential lower and upper bounds.

Improved monitoring of new entry will help improve the robustness of this metric in future NSW GIOs. ASL will do this by monitoring the GW of new projects on a regular basis.

A1.3.2 Lead times

The time spent in a certain pipeline phase is referred to as its 'lead time' within the NSW GIO. In alignment with section A1.2, lead times were measured by the time taken for a project to move from its first milestone in one phase to its first milestone in the next phase. Historic data on the distribution of lead times was used to determine appropriate timing for progressing forward projects in the current pipeline.

The lead time analysis considers all existing wind and solar projects that have completed a phase but may not yet have reached full output, as well as generators that are already in operation. Figure 9 shows the resulting distribution of lead times for each phase, by wind and solar.

Figure 9: Lead time analysis by technology and phase

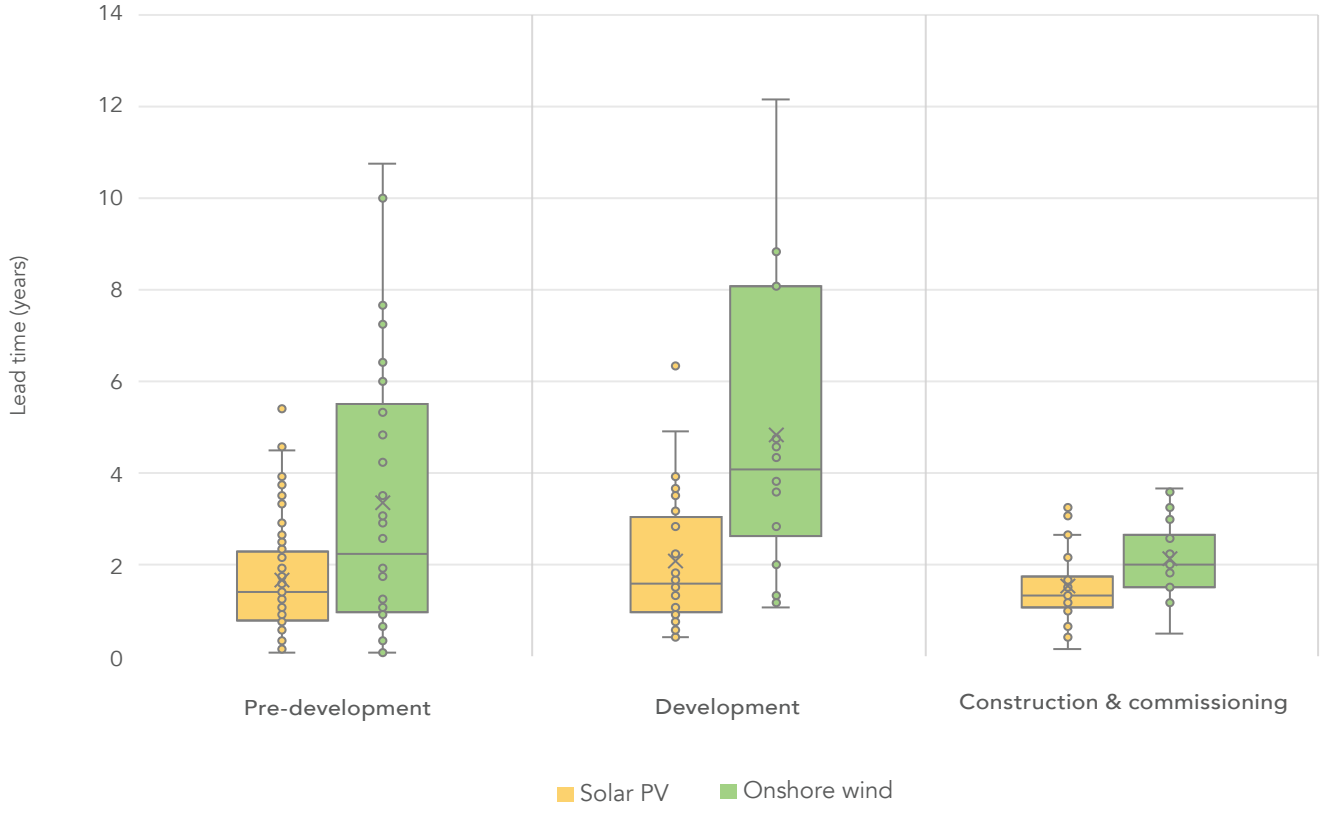


Figure data is ASL analysis drawing from RenewMap (© 2025 RenewMap Pty Ltd, www.renewmap.com.au), Neopoint data and a range of public sources.

The mean for each phase and technology type was used as the assumed lead time for the central scenario – these are indicated by the 'X' symbols on Figure 9. The lower scenario used the 75th percentile, while the upper scenario used the 25th percentile. Table 3 sets out the assumptions for the lead times for each phase and scenario, split by wind and solar.

Table 3: Lead time assumptions

Phase/scenario		Assumption (years)	
		Wind	Solar
Pre-development	Lower	5.3	2.2
	Central	3.3	1.7
	Upper	1.0	0.8
Development	Lower	7.2	2.8
	Central	4.8	2.0
	Upper	3.0	1.0
Construction & commissioning	Lower	2.6	1.7
	Central	2.1	1.5
	Upper	1.5	1.1

The average total lead times in our middle scenario for wind and solar are broadly consistent with Oxford Economics Australia's finding for the 2025 ISP IASR – which finds that onshore wind experiences an 8 year lead time and large-scale solar a 4 year lead time.[15]

15 Oxford Economics Australia, 2025 IASR Planning and Installation Cost Escalation Factors, p. 25.

A1.3.3 Attrition rates

Table 4 sets out the assumptions for attrition rates for each phase and scenario. Attrition rates have not been developed separately for wind and solar due to the very small sample size.

Table 4: Attrition rate assumptions

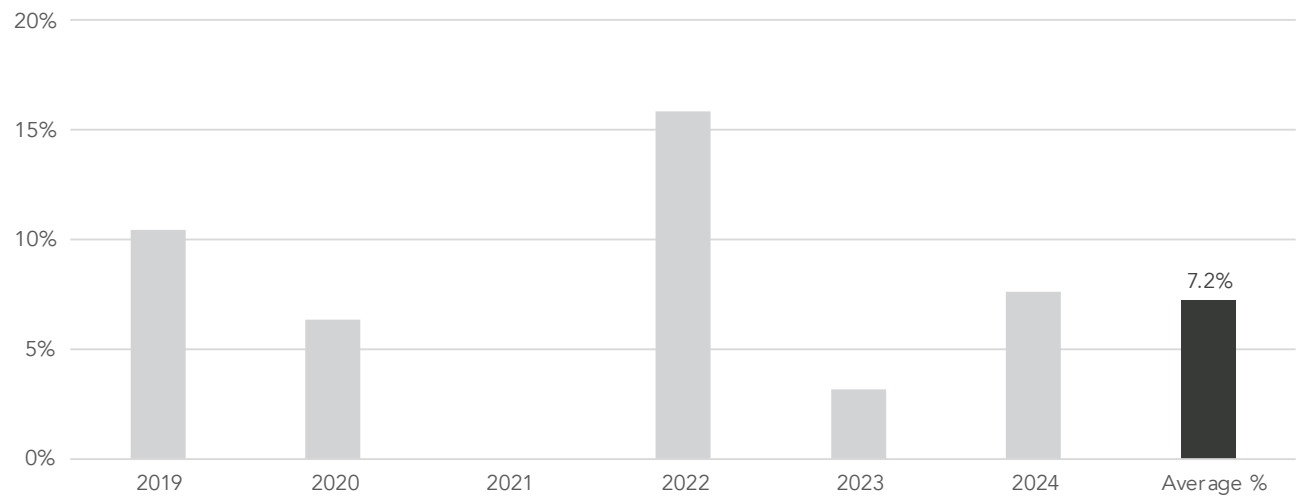
Phase/scenario		Assumption
Pre-development	Lower	20%
	Central	7.2%
	Upper	3.2%
Development	Lower	15%
	Central	10%
	Upper	5%
Construction & commissioning	Lower	1%
	Central	1%
	Upper	1%

There is complexity in determining which projects count towards the attrition rate because it is not always clear whether a project has been abandoned or whether a project has temporarily stalled and may continue at a future date. For example, a developer with a portfolio of projects may pause a particular project to focus on other developments, or wait for investment conditions to change before progressing a project. This effect will be captured to some extent in the lead time analysis. However, the assumptions around attrition rates may be low due to stalled projects that are unlikely to progress, which under a slightly different approach would be classed as abandoned. This will be an area for further exploration in future editions of the NSW GIO.

For pre-development to development, attrition was derived by identifying the amount of projects in the pre-development phase over the last six years that were classified each year as being withdrawn from either the NSW planning approvals process or the Commonwealth Environment Protection and Biodiversity Conservation Act (EPBC Act) approvals process.

The resulting project cohort was then compared to the total amount of projects in the pre-development phase over the same period to determine a rate. Figure 10 shows the results for each year, the central scenario adopts the average across the six years.

Figure 10: Attrition rates over the last 6 years in the pre-development phase



For the development phase and the construction and commissioning phase there was less information on which to establish an assumption for attrition. The central scenario attrition rates for these phases instead draw on the conversion rates from AEMO's Connections Scorecard between the "application" stage and "proponent implementation" stages, respectively. AEMO notes that the conversion rate represents "an indicative 10% that will not proceed through this stage based on historical data". For the construction and commissioning phase, the Connections Scorecard found that attrition rate was 1% which reflects that variation is more likely to be due to changes to the size of the project, rather than a project withdrawing in its entirety.

A1.3.4 Treatment of projects in REZs

The approach to developing the NSW GIO has been to adopt a methodology focussed on identifying the potential health of the NSW pipeline now and over the next decade. In identifying historical lead times and following a project's progress through to full-output the historical lead times include the time it takes to connect to the transmission network including the commissioning stage which ensures that the transmission network is available and has the requisite system security to support new generation. However, it is noted that in respect to available transmission and system security, history may not be a good predictor of the future. This is because the sector is undergoing a vast transition which includes new transmission network being built, in the form of REZs and the introduction of a framework for incoming generators to secure access rights. For this reason, in this first edition of the NSW GIO we have taken bespoke approaches to generation projects that have secured access rights to ensure the results remain sensible.

For current projects that are currently proposed to locate in the South West REZ, this group has been reduced to reflect limitations imposed by the South West REZ declared access scheme. For this REZ, the methodology applied to project into the future, is applied only to projects that have been granted access rights, meaning projects without access rights were excluded from progressing to later stages. This approach was taken because of the large amount of capacity in early pipeline phases in the South West REZ and its understood current level of congestion. Further, it is worth noting that SW REZ projects progress through timeframes according to the NSW GIO lead times and attrition rates rather than confidential commercial operating date information. Therefore any conclusions that may be drawn from the underlying data should be read in the context of the NSW GIO method and approach which treat projects as an aggregated cohort to maintain confidentiality, rather than a commentary on a specific projects' likely progression.

For access right holders in the CWO REZ the progression of generation from construction and commissioning to the full output phase has been delayed compared to the raw results to account for the latest publicly announced timing of the CWO REZ transmission build. As in practice, this transmission build will be necessary for projects to reach full output.

As the dataset continues over time, it will naturally bring in new lead time data points and begin to capture the timing impacts of generators connecting to REZs. In addition, we will seek to account for important impacts on the project cohort such as REZ transmission build and the allocation of access rights. It is also noteworthy that there may be some projects in the general cohort that may locate in the geographical area of the REZ but on the basis of open access rather than obtaining an access right within an access scheme.

Glossary and abbreviations

Term	Definition
CIS	Capacity Investment Scheme
CISA	Capacity Investment Scheme Agreement
committed projects	Generation that is considered to be proceeding under AEMO's commitment criteria (see Generation Information on AEMO's website, link in Table 14).
CWO REZ	Central-West Orana REZ
DA	Development Application
EII Act	Electricity Infrastructure Investment Act 2020
EnergyCo	Energy Corporation of NSW
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
IIO	Infrastructure Investment Objectives
KCI	Key Connection Information
LTESA	Long Term Energy Service Agreement
minimum objective	The minimum infrastructure investment objectives established by section 44(3) of the EII Act
NSW GIO	NSW Generation Investment Outlook
NSW Roadmap	NSW Electricity Infrastructure Roadmap
PPA	Power Purchase Agreement
REZ	Renewable Energy Zone
SEARs	Secretary's Environmental Assessment Requirements
VRE	Variable Renewable Energy