



# COAL PERFORMANCE IN THE NATIONAL ELECTRICITY MARKET

Case Study 3 - Yallourn Power Station

May 2025

nexa  
ADVISORY

## About Nexa Advisory

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Nexa is an advisory firm with an unwavering focus on accelerating the clean energy transition, in a way that provides secure, reliable, and affordable power for consumers of all types.

Nexa Advisory is a team of experienced specialists in the energy market, policy and regulation design, stakeholder engagement, and advocacy. We work with public and private clients including renewable energy developers, investors and climate impact philanthropists to help them get Australia's clean energy transition done.

Nexa Advisory stands at the nexus of the energy sector's complex web of stakeholders. We support and direct their dialogue so as to remove the roadblocks to the transition.

We have a track record in policy creation, advocacy, political risk assessment, and project delivery. We are holistic in our approach and deliver solutions with people in mind, and commercial intent.

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## Executive Summary

Nexa Advisory has analysed the performance of the coal-fired generators across the National Electricity Market (NEM). This report is part of a series of case studies which examines the unreliability and performance of these generators as they approach the end of their technical lives. The reports set out the consequences that any issues highlighted pose for electricity consumers and Australia's energy transition. The reports also make recommendations on ways forward, where appropriate.

In this report, we examine the performance of the 1,450 MW Yallourn Power Station. We find that this generator has faced operational challenges as it approaches the end of its life, resulting in poor reliability and incompatibility with today's dynamic energy system.

We show that Yallourn has high downtime and frequent unplanned outages. It has exhibited elevated unplanned outages over the last decade – with an annual unplanned outage rate of 32 per cent in 2024. Since 2020, the average total downtime across its four units has been over 8,000 hours - equivalent to each unit being offline for over 12 weeks each year.

Our analysis also shows that Yallourn has emitted 12 Mt CO<sub>2</sub> annually in recent years. We estimate that retiring this power station on schedule would achieve around half of the remaining emissions reduction effort still needed to meet Victoria's interim target 45-50 per cent by 2030<sup>1</sup>.

It is clear from our work that Yallourn should not be relied on to provide electricity for Victoria. In the recommendations of this report, Nexa Advisory offers the Victorian Government several ways forward, to ensure Yallourn Power Station can be closed on-schedule in 2028.

Beyond closing Yallourn on time, the Victorian Government must also provide certainty that the transmission required to support renewable generation will be delivered on time. Transmission delays have resulted in an energy crisis in the state and will contribute to power system reliability and security risks after the closure of Yallourn in 2028, as well as increasing energy costs for consumers both large and small<sup>2</sup>.

The Victorian Government must urgently enable the existing pipeline of renewable generation and storage projects, and associated transmission, to replace the energy generated by Yallourn. There is over 7 GW of solar, 1 GW of wind and 4 GW of large-scale batteries that has received state planning, development and/or environmental approvals. Additionally, the state must continue momentum towards achieving its 2 GW by 2032 offshore wind target, with the recent publication of its Implementation Statement 4, and 13 projects (26.3 GW) being awarded feasibility licences.

<sup>1</sup> Based on 2022 Victorian greenhouse gas emissions reporting

<sup>2</sup> Nexa Advisory, [The Consumer Cost of Transmission Delays](#), March 2024

There is also a broader pipeline of proposed projects – including 16 GW of solar and wind and 5 GW of large-scale battery storage projects - that can be accelerated to strengthen Victoria’s renewable energy pipeline and deliver additional capacity and leverage the rich renewable resources of the state.

These steps will be critical to ensuring a reliable electricity supply, and minimising the potential gas shortfalls, during peak demand periods, that have been forecast by the Australian Energy Market Operator (AEMO).

Recent announcements, including support for Liquefied Natural Gas (LNG) import terminals and potential gas reservation policies, reflect prudent contingency planning for the state’s electricity system. However, Nexa Advisory believes that with clear policy direction, well-targeted investment, and strong community engagement, Yallourn can be retired on schedule in 2028 and ensure reliable, affordable and low-carbon electricity for all Victorian consumers.



## Recommendations

Nexa Advisory continues to advocate for the accelerated build out of the replacement generation across the NEM. There is a clear case for diversifying Victoria's energy infrastructure away from coal-fired power stations by continuing to invest in renewable energy generation and storage capacity – both large and small – to ensure secure, reliable, and affordable energy supply.

We urge the Victorian Government to:

- 1. Commit to the on-time closure of Yallourn in 2028:** This would provide a clear signal for investors in, and developers of the required renewable replacement capacity and storage needed to support an orderly exit of these coal-fired power stations.
- 2. Lean into new capacity build:** Maintain the current rate of renewable energy development and deliver the 8 GW of approved wind and solar projects, 4 GW of large-scale battery projects currently in the pipeline, as well as the 26.3 GW of Victorian offshore wind projects which have received feasibility licences.
- 3. Accelerate near-term approvals:** Expedite planning approvals for projects deemed to be critical for the state's energy transition. Streamlined and accelerated planning and environmental approvals would be particularly effective for projects which have relatively small footprints, such as large-scale batteries.
- 4. Look beyond the Renewable Energy Zones (REZ):** There are high value projects outside of REZs that can be prioritised to diversify the state's generation and storage capacity in the near-term. These projects should not be delayed because of the development of the REZ framework.

This should include enhancing the capacity of existing transmission lines through the deployment of large utility-scale batteries and enable private / market-led intra-regional transmission projects identified by investors, renewable developers and/or non-traditional Transmission Network Service Providers (TNSPs).

- 5. Leverage the untapped potential of consumer energy resources (CER) for homes and businesses:** Prioritise consumer energy solutions such as solar, home batteries, electric heat pumps, and EVs through incentives and targets. There are significant untapped opportunities across CER and demand-side participation which would help to achieve the state's renewable energy and emissions commitments, minimise reliance on gas during peak demand and directly reduce consumer bills.

There is an estimated 6 GW of potential rooftop CER capacity across Commercial and Industrial (C&I) buildings in Victoria.

This could also be supported by additional actions to accelerate the deployment of small-scale storage and Virtual Power Plants (VPPs).

## Context

**There is broad recognition in Australia of the urgent need to build adequate capacity to replace our ageing and unreliable coal-fired generation fleet, and ensure energy security, reliability and affordability. Australians also understand the benefits of clean and low-cost renewable generation.**

Among other things, uncertainty about the retirement timetable for coal-fired power stations erodes the confidence of investors and developers in new energy resources and therefore poses a significant risk to an orderly energy transition.

Brown coal-fired generation remains a significant portion of Victoria's energy mix – comprising 58.8 per cent of electricity generated in the state in 2024.

In recent years, Yallourn Power Station has provided around 22 per cent of Victoria's electricity<sup>3</sup>. As such, the closure of this power station in 2028 will be a pivotal milestone in Victoria's decarbonisation and clean energy transition.

The recent 2024 Electricity Statement of Opportunities (ESOO) by the Australian Energy Market Operator (AEMO) has shown there is potential risk to power reliability in Victoria after Yallourn's closure (in 2028) if new generation, storage and transmission capacity is delayed or fails to eventuate<sup>4</sup>. However, AEMO indicated that this risk can be mitigated if transmission projects – including VNI West and the East and West Metro projects – are delivered on time, and there is additional CER uptake.

It is clear that Yallourn Power Station is facing operational and market challenges as it approaches the end of its life. In light of these issues, this report assesses the performance of the ageing generator to determine how it is positioned to continue to supply Victoria's electricity until 2028.

Our analysis of Yallourn's generation examines half-hourly generation data from the start of 2012, identifying trends in its performance – including outage patterns, price responsiveness and emissions.

<sup>3</sup> EnergyAustralia, [History](#), accessed 3 April 2025

<sup>4</sup> AEMO, [2024 ESOO](#)

# 1. Analysis

Yallourn Power Station is located in Victoria's Latrobe Valley, with a nameplate capacity of 1,450 MW across two 350 MW and two 375 MW generating units.

It was commissioned in its current form in stages between 1974 and 1982. It was initially expected to close by 2032 (based on an expected 50-year technical life span).

In 2021, the asset's owner, EnergyAustralia, announced plans to bring forward its shutdown to mid-2028<sup>5</sup>. EnergyAustralia also made an agreement with the Victorian Government to develop a 350 MW, four-hour battery energy storage system (BESS) by 2026.

Yallourn has not been without controversy. The plant has faced scrutiny for safety and environmental issues, including several safety incidents<sup>6</sup> within the power station, and damage to a river diversion which resulted in the shutdown of the coal mine which supplies the generator.

There was a temporary shutdown of three generating units in 2021<sup>7</sup>. A similar incident occurred in 2012<sup>8</sup>, leading to a shutdown of 75 per cent of the power station.

In 2012, EnergyAustralia announced it was temporarily idling one of the plant's units<sup>9</sup>. This was the result of several factors, including low demand and changes to Australia's Renewable Energy Target scheme. However, this unit was returned to service during the following year.

The increasing challenges to Yallourn's reliability have led EnergyAustralia to bring forward \$400 million in maintenance works to ensure it can continue to operate until 2028<sup>10</sup>.

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5 EnergyAustralia, [EnergyAustralia powers ahead with energy transition](#), 10 March 2021

6 ABC News, [Yallourn Power Station safety concerns are bad news as Australia enters long, hot summer](#), 21 September 2023

7 RenewEconomy, [Too wet for coal power: Yallourn units shut down due to flooded mines](#), 15 June 2021

8 ABC News, [Yallourn coal mine failings should be subject of inquiry, environment groups say](#), 1 September 2021

9 EnergyAustralia, [Changes to Renewable Energy Target required for a sustainable electricity market](#), 24 October 2012

10 Australian Financial Review, [EnergyAustralia, owned by Hong Kong-based CLP Group, to tackle Yallourn outages after big loss](#), 27 February 2023

## 1.1. Capacity factor

As shown in Figure 1, Yallourn has experienced declining output since 2016. Since 2022, it has remained at the historical low of around 60 per cent of its 1,450 MW nameplate capacity – this is around the average annual capacity factor for coal plants across the NEM<sup>11</sup>.

This level of output underutilisation is an outcome of shifting structural market conditions, such as increased competition from renewable generation and other operational factors.

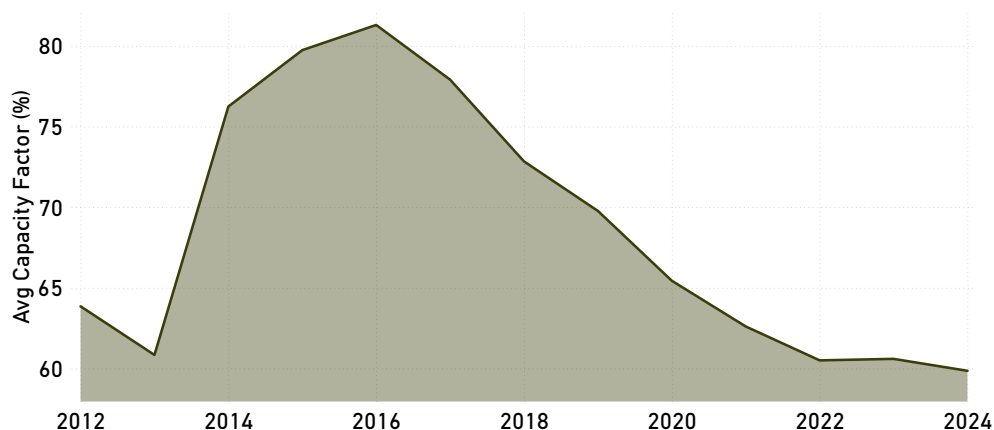


Figure 1 – Yallourn annual capacity factor

## 1.2. Annual generation profile

Our analysis shows that Yallourn has faced persistent shutdowns throughout each year since 2012, with generation remaining well below the average nameplate capacity of each of its four units.

Figure 2 shows the average per unit generation profile Yallourn, with and without the shutdown periods, by month since 2012. The difference between these reflects the impact of shutdowns on the seasonal profile of the power station; a larger difference indicates longer shutdown periods during a specific month.

Since 2012, shutdowns have reduced the average monthly generation of its units by between 30-90 MW. Yallourn sees the lowest impact of shutdowns in January, increasing through the year until Quarter 4 – when average generation is reduced to around 260 MW. This suggests that shutdowns become longer and/or more frequent over the calendar year, which may indicate operational or commercial factors driving this behaviour.

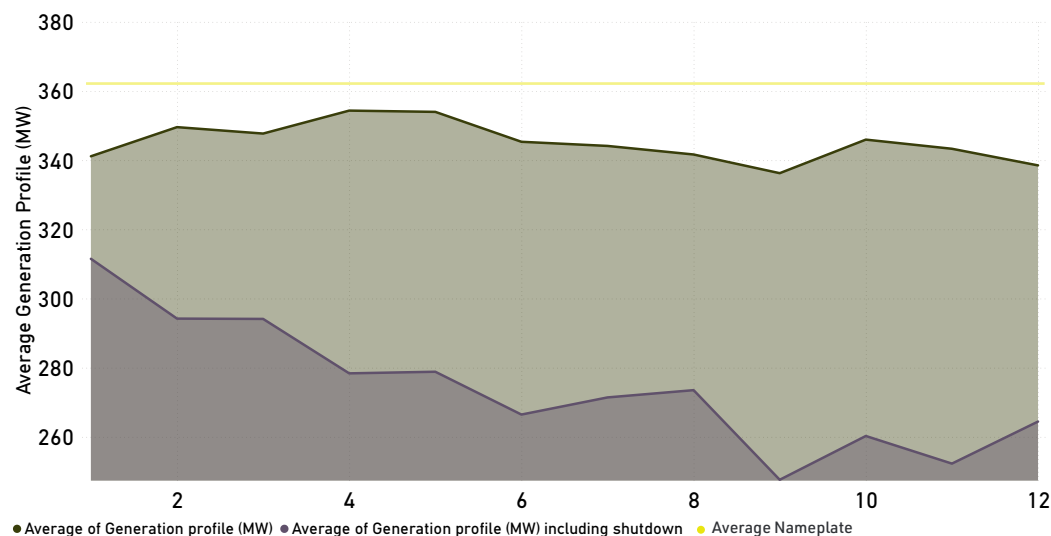


Figure 2 – Yallourn average generation of each unit (MW) by month since 2012, with and without shutdown periods

<sup>11</sup> CSIRO, [GenCost 2024-25](#)

### 1.3. Downtime analysis

As shown in Figure 3, we assessed downtime to better understand Yallourn's performance since 2012.

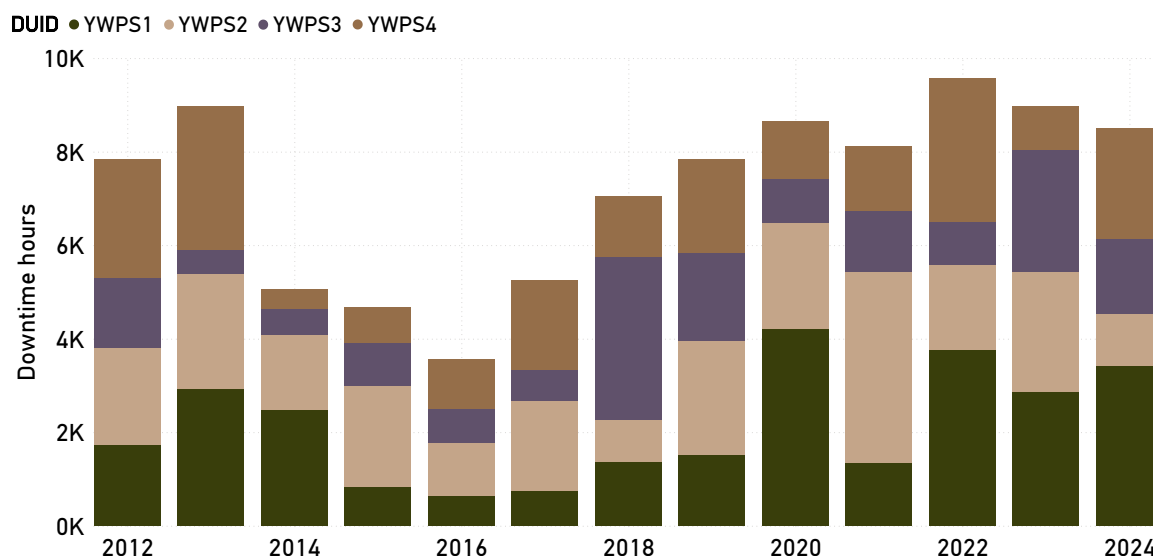


Figure 3 – Yallourn downtime over the years

Following the challenges in 2012-13, EnergyAustralia completed efficiency upgrades in 2014 as part of its major maintenance<sup>12</sup>. This likely contributed to the reduction in downtime in the mid-2010s. However, this improved performance did not last.

Yallourn has experienced increasing downtime across its four units since 2016, totalling over 8,000 hours of average total downtime across its units since 2020. This is equivalent to each unit remaining offline for over 12 weeks each year.

This aligns with the falling annual capacity factor since 2016. It suggests that, even with the major maintenance that is typically conducted on each unit at least once every six years<sup>13</sup>, the power station is seeing increasing operational challenges as it approaches the end of its life.

### 1.4. Unplanned outage rate

To better understand the potential drivers of downtime, we have analysed outage types and classified them as planned or unplanned, using Medium Term Projected Assessment of System Adequacy (MT PASA) information and rebidding explanations<sup>14</sup>.

MT PASA requires generators to report the availability status of their units, reasons for any outage, and recall time. Additionally, rebids include explanations for the changes.

However, these sources are subject to variability and inconsistency in reporting. As such, we have classified a small number of outages, where there was some ambiguity, as 'unclear'.

<sup>12</sup> EnergyAustralia, [Yallourn Social and Environmental Performance Summary 2014](#)

<sup>13</sup> EnergyAustralia, [Yallourn Social and Environmental Performance Summary 2017](#)

<sup>14</sup> See Appendix 1 for further explanation of methodology.

Figure 4 shows the total outage hours by type across Yallourn’s four units since 2012. Although unplanned outages hours vary within each year, this shows unplanned outages averaged 1,400 hours – or almost half of all outages – each year between 2012 – 2020.

From 2020, the proportion of unplanned outages fell to 35 per cent, due to an increase in planned outages.

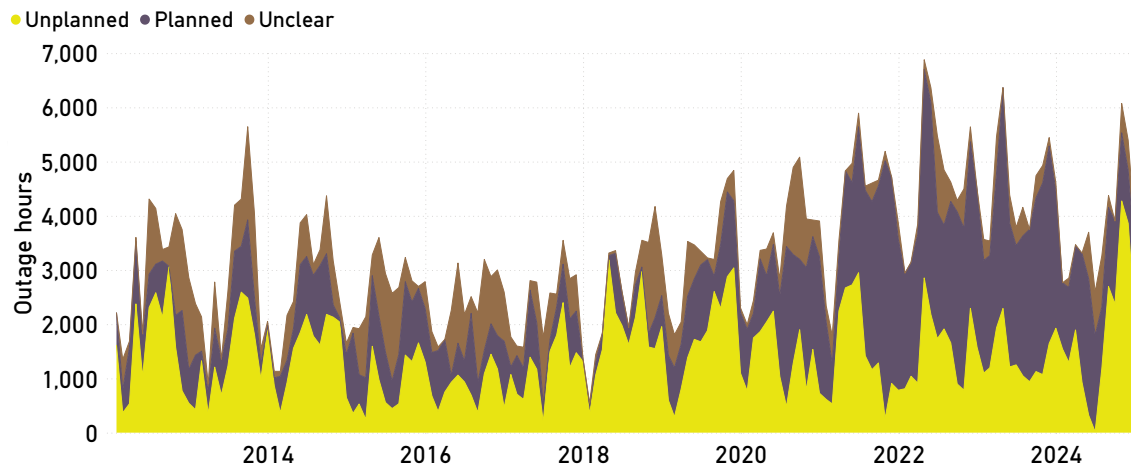


Figure 4 – Yallourn’s outages by type

Analysis of the average annual unplanned outage rate also shows the power station has often experienced significant unplanned events. Figure 5 shows the annual unplanned outage rate – when any unit experiences an unplanned outage – often exceeds 15 per cent (which is the partial unplanned outage rate assumed for brown coal by AEMO in its most recent Inputs, Assumptions and Scenarios Report)<sup>15</sup>.

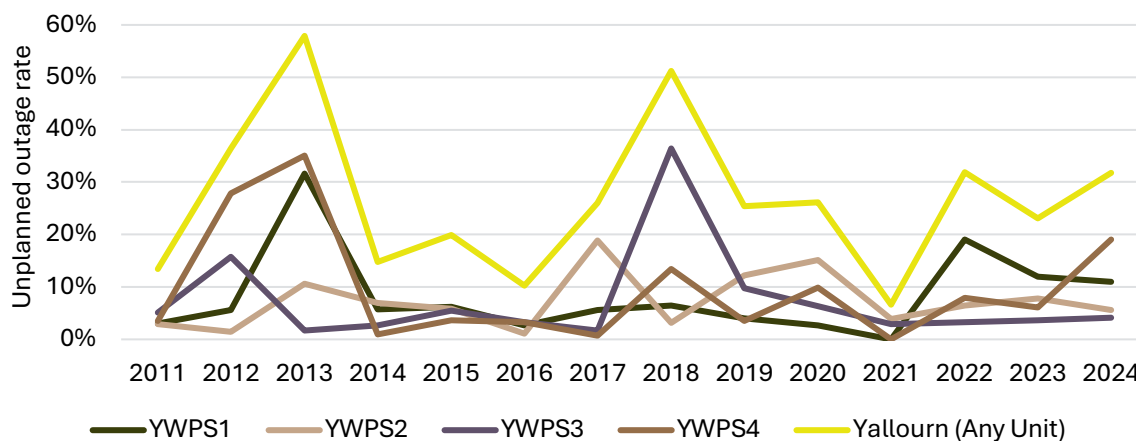


Figure 5 – Yallourn’s annual unplanned outage rate

This high unplanned outage rate presents a significant power supply reliability risk for Victoria and the broader electricity system. It is also a key driver of higher market volatility and contract prices, which result in higher consumer electricity bills<sup>16</sup>.

<sup>15</sup> AEMO, [Draft 2025 IASR Draft Report](#), December 2024

<sup>16</sup> AER, [Wholesale electricity market performance report 2024](#), December 2024

## 1.5. Price responsiveness

In today’s dynamic energy system, it is critical that Yallourn is responsive to market signals.

However, our analysis shows Yallourn lacks responsiveness, which indicates an inability to ramp up generation during high- price periods (> \$300/MWh).

Figure 6 shows average quarterly generation of Yallourn’s units, since 2020. While there are some instances of minimal price responsiveness - such as unit 1 in Quarter 2 and unit 4 in Quarter 1 - the plant overall does not consistently respond to market price signals.

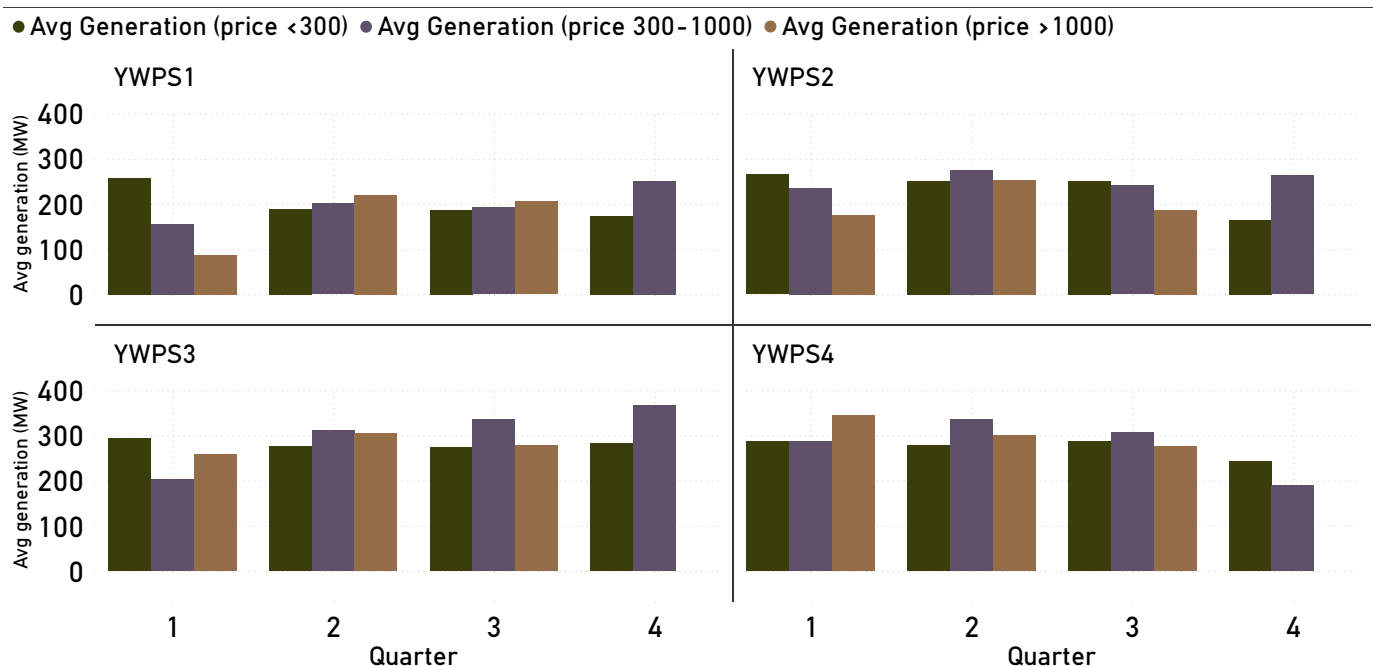


Figure 6 – Yallourn price responsiveness, average 2020-2024

## 1.6. Carbon emissions

In addition to Yallourn's unreliable generation and inefficiency in terms of price responsiveness, the coal-fired power station poses an ongoing risk to the achievement of the Victorian Renewable Energy Targets of:

- 65% by 2030; and
- 95% by 2035.

This is in addition to interim emissions reduction targets of:

- 28-33% below 2005 levels by 2025;
- 45-50% below 2005 levels by 2030; and
- 75-80% below 2005 levels by 2035<sup>17</sup>.

In 2022, Victoria emitted 84.7 Mt CO<sub>2</sub>-e, almost half of this (40.4 Mt CO<sub>2</sub>-e) came from electricity generation<sup>18</sup>. This must be reduced to approximately 60 Mt CO<sub>2</sub>-e to meet the state's 2030 emissions reduction target.

As shown in Figure 7, Yallourn has emitted between 12 and 16.2 Mt CO<sub>2</sub> each year since 2012, remaining around 12 Mt CO<sub>2</sub> in recent years. These emissions can be conservatively valued at \$391.2 million<sup>19</sup>.

This means Yallourn alone represents around 50 per cent of the emission reductions needed over the next five years.

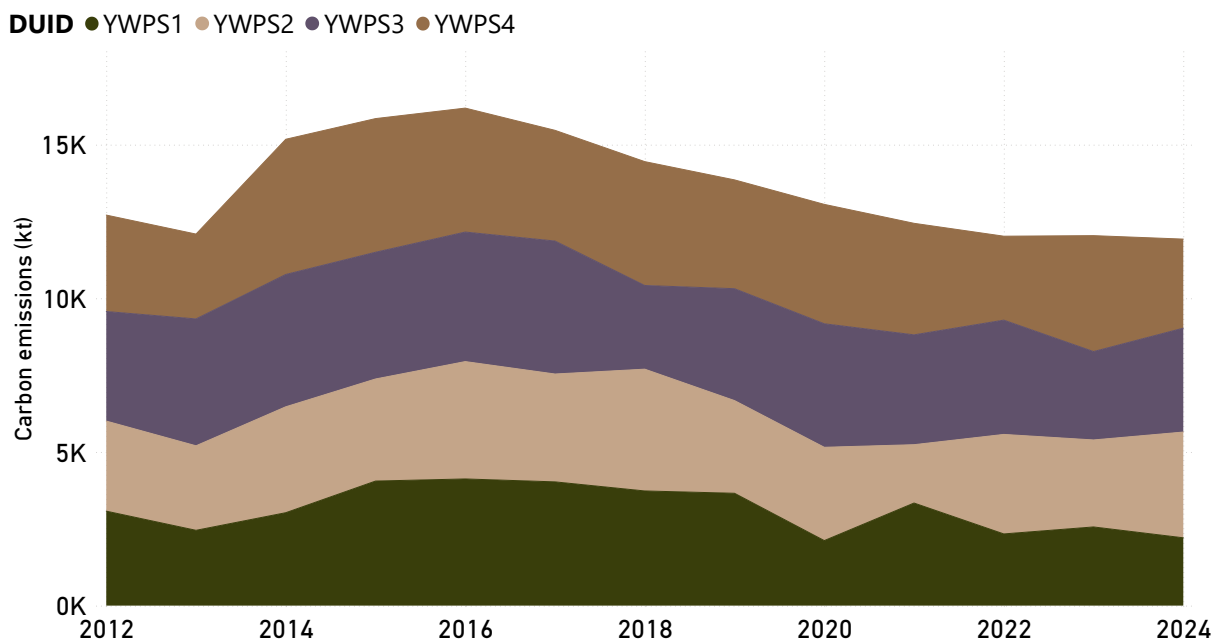


Figure 7 – Yallourn carbon emissions

<sup>17</sup> Victorian Government, Department of Energy, Environment and Climate Action, [Climate action targets](#), accessed 2 April 2025

<sup>18</sup> Victorian Government, Department of Energy, Environment and Climate Action, [Greenhouse gas emissions](#)

<sup>19</sup> Based on current Australia Carbon Credit Unit spot price of \$32.60.

## A strong pipeline of replacement generation and storage in Victoria

We have assessed the current development pipeline to better understand what will be needed to ensure replacement capacity for Yallourn Power Station can be delivered by 2028.

As shown in Figure 8, there is a strong development pipeline of approved and proposed renewable generation and storage projects which, if accelerated, can be delivered prior to the planned closure of the state's coal-fired power stations over the next decade. This includes 8 GW of wind and solar, and 4 GW of large-scale battery projects which have been approved.

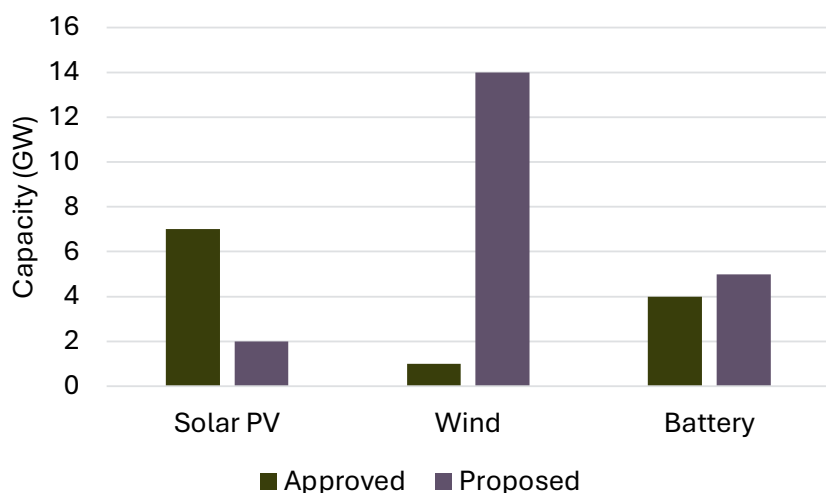


Figure 8 – Victoria renewable energy project pipeline<sup>20</sup>

There is also a 16 GW pipeline of solar and wind projects, as well as 5 GW of large-scale battery projects, which have been proposed.

It is important to note the important role that batteries, as well as long-duration storage such as pumped hydro, will play in satisfying demand during peak periods and providing essential system services.

There is also a strong pipeline of 26.3 GW of offshore wind projects which have received feasibility licences and are progressing pre-development activities in the Gippsland and Southern Ocean Offshore Wind Zones<sup>21</sup>. These will contribute to the state's offshore wind targets of 2, 4 and 9 GW by 2032, 2035 and 2040 respectively, and help to diversify the state's generation mix.

There is a clear role for the Victorian Government in helping to accelerate the development of these projects to deliver cheaper, more reliable replacement capacity before the expected closure of Yallourn in 2028. It has already taken steps to support renewable projects through the Development Facilitation Program and designation of all new renewable energy projects as significant economic developments<sup>22</sup>, as well as ongoing support for offshore wind projects<sup>23</sup>.

<sup>20</sup> Source: AltEnergy; where approved projects are defined as having received state planning, development and/or environmental approvals, and proposed projects are those publicly announced.

<sup>21</sup> Victorian Government, [Victoria's offshore wind farm locations](#), 17 April 2025

<sup>22</sup> RenewEconomy, [Faster, not different: Victoria renewables fast-track is not a steamroller](#), 20 March 2024

<sup>23</sup> Victorian Government, Offshore Wind Energy Victoria, [Implementation Statement 4](#), April 2025

**The Victorian Government must continue to facilitate renewable generation and storage projects, as well as the delivery of transmission infrastructure to ensure Yallourn can be closed on time.**

## Slow delivery of transmission in Victoria

The factors contributing to the slow transition are many and complex, but a key issue is the ongoing delays to delivering new transmission projects, particularly interconnectors<sup>24,25</sup>. This is particularly true in Victoria, which has failed to deliver the necessary transmission projects such as Victorian Network Interconnector West (VNI West) and Western Renewables Link (WRL) on time, and has seen commensurate cost increases in these projects. For example, VNI West has seen a 23 per cent cost increase in recent years for VNI West and a delayed delivery date of 2029<sup>26</sup>.

The delays of these transmission projects have created an energy crisis in the state, posing a significant risk to power system reliability and security after the closure of Yallourn in 2028, as well as increasing costs for consumers both large and small<sup>27</sup>.

Critically, uncertainty around coal closure and transmission delivery remain two of the largest risks faced by renewable developers. This failure to build transmission quickly enough reflects market structure rather than market design.

Despite the recent introduction of contestability under the jurisdictional transmission planning framework in Victoria<sup>28</sup>, transmission development has been dominated by social license challenges associated with large projects such as WRL and VNI-West. There has been limited focus on broader transmission planning which may mitigate these challenges, such as:

- the deployment of large-scale batteries to enhance the capacity of existing transmission lines (e.g., virtual transmission); and
- support for private / market-led intra-regional transmission projects that can be delivered faster to support renewable generation.

The recent appointment of VicGrid as the transmission planner in the state has led to the development of the REZ framework, with the Draft Victorian Transmission Plan expected by mid-2025.

However, this process has seen several challenges emerge - including regulatory delays, investor concerns about restricted project opportunities outside REZs<sup>29</sup>, community opposition and environmental concerns.

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24 Nexa Advisory, [We Plan and then Don't Build](#), May 2024

25 Nexa Advisory, [Supercharging Transmission Buildout](#), September 2024

26 From its [2022 Project Assessment Draft Report](#) to cost [reported](#) in 2024

27 Nexa Advisory, [The Consumer Cost of Transmission Delays](#), March 2024

28 Victorian Government, Department of Energy, Environment and Climate Action, [Developing the 2025 Victorian Transmission Plan](#), accessed 3 April 2025

29 For example, through the proposed Victorian Access Regime and [Grid Impact Assessment](#) process

This has left the Victorian Government with little option but to explore gas-powered generation and gas supply security initiatives such as the Viva Energy LNG Import Terminal and Golden Beach Gas Project to mitigate the reliability risk of the state's disorderly transition.

These initiatives reflect AEMO's 2025 Gas Statement of Opportunities (GSOO), which indicates that GPG will play a more prominent role post-2028. AEMO has noted that peak day gas demand will increase over this period and may result in shortfalls during days of peak demand, or seasonal supply gaps<sup>30</sup>.

However, we have previously discussed that the reliance on gas caused by transmission delays drives our dependence on international gas prices, and results in higher wholesale electricity prices<sup>31</sup>.

**Rather than delaying this transition in the face of this risk, the Victorian Government must mobilise additional measures to ensure reliability, affordability and resilience for Victorian electricity consumers.**

The Victorian Government must continue to drive initiatives to accelerate the transition, ensuring the forecast risk of gas shortfalls does not threaten the on-time closure of Yallourn in 2028.

In particular, Commercial and Industrial (C&I) Consumer Energy Resources remains an untapped opportunity which should be explored by the state. We estimate there could be over 6 GW of potential C&I rooftop solar in Victoria which, if leveraged, would contribute to reliability for the state and reducing the demand for gas.

<sup>30</sup> AEMO, [2025 Gas Statement of Opportunities](#)

<sup>31</sup> Nexa Advisory, [The Consumer Cost of Transmission Delays](#), March 2024

# Appendix 1

We classify outages into planned and unplanned using the below methodology.

## 1. Set Outage Threshold

- Define an outage threshold (e.g., 5 MW) to help determine planned versus unplanned outages.

## 2. Check Unit State (pasaunitstate)

- If the unit state is "UNPLAN" or "FORCE", classify the outage as **Unplanned**.
- If the unit state is "INACTIVERESERVE", classify the outage as **Planned**.

## 3. Check Ramp-Down Rate for a Trip

- If no classification has been made yet and max ramp-down rate is available:
- If the actual ramp-down rate exceeds the allowed maximum, classify the outage as **Unplanned**.

## 4. Check MTPASA Availability

- If no classification has been made yet and availability data is present:
- If availability is below the outage threshold, classify the outage as **Planned**.

## 5. Compare Target MW vs. Actual MW

- If no classification has been made yet and ramp-down data is available:
- If the actual MW is significantly below the target MW and exceeds the maximum allowed drop, classify the outage as **Unplanned**.

## 6. Analyse Rebid Explanation Field

- If no classification has been made yet and a reason is provided:
- If the explanation contains terms such as "trip", "leak", "fault", "fail", or "unexpected", classify the outage as **Unplanned**.

## 7. Check Target MW for Planned Shutdowns

- If the target MW is very low (below three times the outage threshold), classify the outage as **Planned**.

## 8. Reevaluate Unit State for Planned Outages

- If the unit state contains "PLAN" but does not contain "UNPLAN", classify the outage as **Planned**.

## 9. Final Classification

- If none of the above checks result in a classification, mark the outage as **Unclear**.



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