Australian Government
Clean Energy Regulator

Quarterly Carbon Market Report







CLEAN ENERGY REGULATOR

March Quarter 2025

Contents

Report objective

Carbon markets play a key role in Australia's efforts to reduce emissions. The Clean Energy Regulator (CER) has prepared this report to support the effective operation of Australia's carbon markets.

This report consolidates information across the national carbon markets that the CER administers for the March Quarter 2025 (January to March 2025). It provides information on supply and demand trends and opportunities that may inform market decisions.

Questions? Suggestions? Please get in touch

We welcome your feedback. To help us ensure that our QCMR are as helpful and informative as possible, we welcome your suggestions for future editions of this report. Please provide feedback to Manager, Economic and Market Analysis via:

- Email: enquiries@cer.gov.au
- Post: Clean Energy Regulator, GPO Box 621 Canberra ACT

Report disclaimer

All figures are sourced from the CER unless otherwise referenced. All statements in this report reflect current policy settings, other than in specific instances where the Australian Government has announced or is consulting on proposed policy changes.

This Quarterly Carbon Market Report (QCMR) represents the views of the CER at the date of publication. The CER is providing this information to the market to increase market transparency, help identify genuine low-cost carbon abatement opportunities and assist entities that produce or need to source units and certificates under the schemes the CER administers. The CER has used its best endeavours to ensure the quality of the information in this document but cannot guarantee its accuracy or completeness. The QCMR is not legal, business or financial advice. You should obtain independent professional advice on your circumstances before making any investment decisions. The information is provided as general information only. Neither the CER, nor the Commonwealth of Australia will accept liability for any direct, incidental or consequential loss or damage resulting from the QCMR, or the information provided through the QCMR, or the availability or non-availability of the QCMR.

Version history

Version	Date	Changes
1.0	12/06/2025	Initial publication

Glossary

The CER glossary includes definitions/explanations of many terms and acronyms used throughout this report.

Highlights

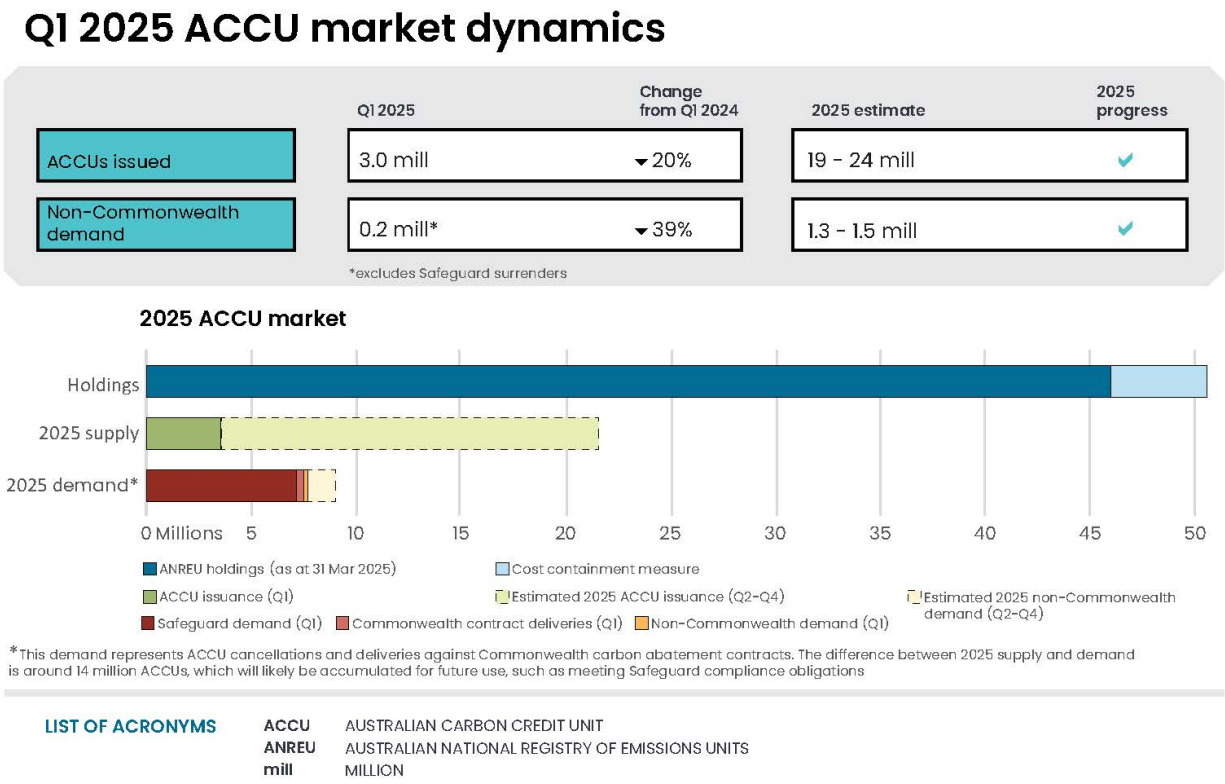
- The first compliance year of the reformed Safeguard Mechanism has concluded with the outcomes delivered consistent with the reformed policy settings. Detailed data published by the Clean Energy Regulator (CER) on 15 April show:
  - Emissions from safeguard facilities reduced from 138.7 million tonnes of carbon dioxide equivalent (Mt CO_2-e) in 2022-23, to 136.0 Mt CO_2-e.
  - 142 facilities surrendered 1.4 million Safeguard Mechanism credit units (SMCs) and 7.1 million Australian carbon credit units (ACCUs) to manage their excess emissions.
  - ACCUs surrendered for the 2023-24 compliance year have surpassed all pre-reform years.
- Looking forward, the CER expects tightening baselines to reduce SMC issuances and increase total ACCU and SMC surrenders. This will further strengthen facilities' incentive to make on-site emissions reductions.
- ACCU issuances in 2025 are on-track to meet the projected range of 19 to 24 million. High volumes of crediting applications on-hand are likely to translate into stronger issuances over the year.
- Q1 2025 was a record Q1 for large scale electricity generation in both of Australia's major electricity grids. Renewable energy in the National Electricity market (NEM) averaged 43% this quarter. Renewable penetration will continue to grow, supported by a healthy approvals and investment pipeline.
  - The CER approved 1.7 gigawatts (GW) of new large-scale generation capacity by 31 May. With 1.2 GW of applications on hand we expect to exceed the lower end of the projected 2.7 to 3.1 GW range for 2025.
- The large-scale generation certificate (LGC) market is in surplus, despite growing voluntary demand. This reflects the success of policies including the Large-scale Renewable Energy Target (LRET) in driving investment and accelerating the deployment of renewable energy projects. As a result, LGC prices have declined as long expected.
  - The LGC price decline is unlikely to materially impact investment because the drivers of investment are changing, with the Capacity Investment Scheme and other policies supporting investment.
- From 1 July 2025, the Small-scale Renewable Energy Scheme (SRES) will expand to include small-scale battery systems under the Cheaper Home Batteries Program.
  - This will reduce the upfront cost of a typical battery by around 30%. The discount will be based on the solar battery's usable capacity and will gradually decrease until 2030.
  - The Australian Government will regularly purchase STCs, equivalent to the amount created from batteries, through the Clearing House.
  - The number of STCs that liable entities must purchase to meet their SRES liabilities will not change. This means that the cost of the Cheaper Home Batteries Program is met by the government rather than being passed through to electricity prices.
  - 2025 installed rooftop capacity is on track to fall within our projected range of 2.9 to 3.2 GW, with the potential for further upside due to the Cheaper Home Batteries Program.

1. Safeguard and Australian carbon credit unit (ACCU) schemes

Insights

- 2023-24 Safeguard Mechanism data published by the CER on 15 April 2025 shows that the reformed scheme is progressing well.
  - » Emissions from safeguard facilities reduced from 138.7 million tonnes of carbon dioxide equivalent (Mt CO_2-e) in 2022-23, to 136.0 Mt CO_2-e.
  - » The scheme creates incentives for reduced emissions intensity and approximately 8.3 million Safeguard Mechanism credit units (SMCs) have been issued to 62 facilities with emissions below their baselines.
  - » 142 facilities surrendered 1.4 million SMCs and 7.1 million Australian carbon credit units (ACCUs) to manage their excess emissions.
  - » The volume of ACCUs surrendered exceeded the total volume surrendered in all years pre-reform.
  - » The scheme achieved a compliance rate of 98% amongst 219 facilities.
- Baselines will generally continue to decline at 4.9% per year to 2030. Tightening baselines will progressively strengthen the incentive facilities have to identify, invest in, and deliver on-site emission reductions.
  - » Facilities will need to develop a clear strategy for managing compliance obligations that balances the sourcing and use of ACCUs and SMCs with the facility's plans for direct emission reductions.
- ACCU holdings fell from around 50 million to 46 million over the quarter.
  - » This is due to surrenders from safeguard and safeguard related entities holding an estimated 27.9 million at the end of Q1 2025, down from 31.2 million at the end of Q4 2024.
  - » 0.4 million ACCUs were delivered into the cost containment account, which reached 4.2 million at the end of the quarter.
- The ACCU market remained highly active in Q1 2025 with safeguard being the main driver of trading.
  - » Q1 2025 has seen the most ACCUs transacted in the Australian National Registry of Emissions Units (ANREU) of any quarter to date at 30.9 million. Safeguard and safeguard-related entities are a strong driver of this activity. Almost three quarters of the ACCUs transacted this quarter (22.1 million ACCUs) involved safeguard or safeguard related accounts.
- 2025 ACCU issuances remain on track to meet our projection of 19 to 24 million ACCUs.

Image 1: Q1 2025 ACCU market dynamics



Reformed Safeguard Mechanism progressing well

The CER published the final outcomes of the first compliance period of the reformed Safeguard Mechanism on the statutory deadline of 15 April 2025, updating estimates published in the Q4 2024 QCMR. The 2023–24 safeguard publication includes the first data from the reformed scheme after declining baselines were introduced. The data shows that results align with the expectations established through the reformed policy settings. Key highlights included:

- Emissions from safeguard facilities reduced from 138.7 million tonnes of carbon dioxide equivalent (Mt CO_2-e) in 2022-23, to 136.0 Mt CO_2-e.
- Aggregate baselines for 2023–24 were 136.1 Mt CO2-e. At a scheme level, the emissions intensity determinations (EIDs) removed nearly all the 'headroom' from aggregate facility baselines. Aggregate headroom is the difference between total covered emissions and total baselines. EIDs set facility-specific emissions-intensities for each product produced at a safeguard facility, based on the facility's historical production and emissions data.
  - 7 EIDs were varied to reflect a change in the relevant facilities' emissions because of a move to a higher order method for estimating methane and other emissions. These variations helped ensure consistency between baseline calculation and annual emissions reporting.
  - Ensuring consistency is important, and stops facilities from receiving a windfall gain of SMCs. Where a change in method results in a facility's emissions decreasing, a variation makes a corresponding reduction to the facility's EID, so the facility is not eligible for SMCs purely as a result of changing method.
  - Method 1 generally allows for the use of default emission factors based on state or national averages. Higher order methods are more rigorous and in principle provide greater accuracy but require more active measurement effort. They generally involve varying degrees of on-site sampling,

analysis, or direct measurement. Use of a higher order method may result in either an increase or decrease in emissions, compared to the amount estimated using Method 1.

  - » Of the 7 EID variations, 2 resulted in an increased EID for the relevant production variable, while 5 resulted in a decreased EID.
  - » The 7 variations included 4 for coal mines which moved from estimating emissions based on coal production to more precise estimates based on on-site measurement.

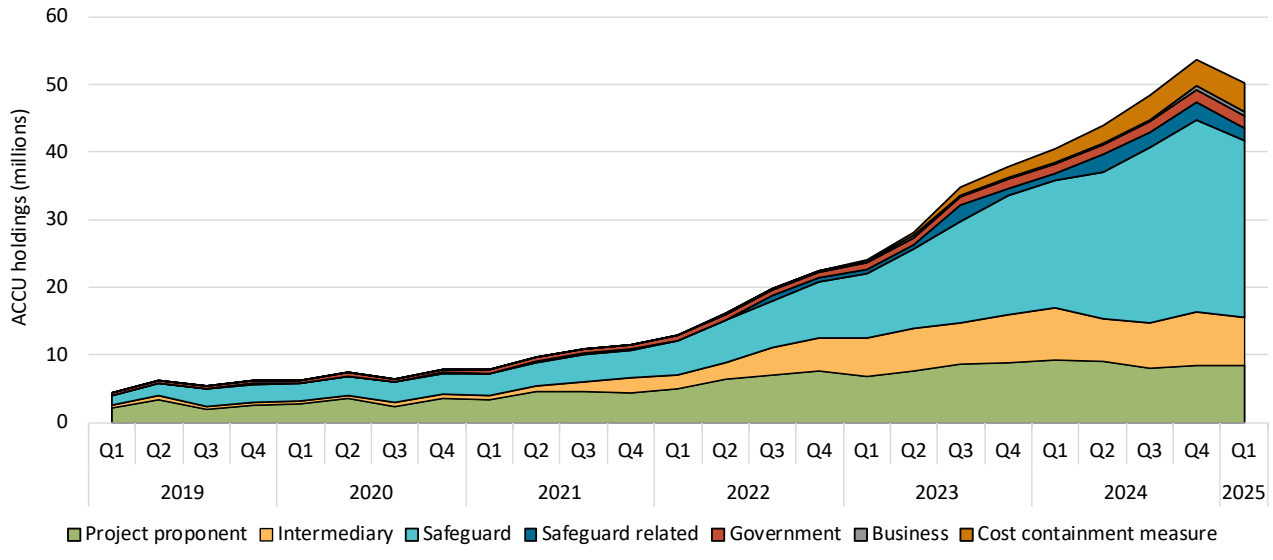
- Following surrender of SMCs and ACCUs by facilities above their baseline, 214 safeguard facilities were not in an excess emissions situation on 1 April, complying with the requirements of the Safeguard Mechanism.
  - » 62 facilities received 8.3 million SMCs because their emissions were below their baseline.
  - » 142 facilities incurred a liability of 9.2 Mt CO2-e because their emissions were above their baseline. These facilities surrendered 7.1 million ACCUs and 1.4 million SMCs to manage their excess emissions. Twenty-six facilities accessed flexibility measures, for example deferring liabilities through multi-year monitoring periods or borrowing.
  - » 5 facilities remain in excess due to being in administration or entering an enforceable undertaking to bring their facility into compliance following demonstration of financial hardship.

The significant increase of surrendered ACCUs, from 1.2 million in 2022-23 to 7.1 million in 2023–24, is a result of the reformed scheme. Safeguard entities can use SMCs and ACCUs to manage their excess emissions while onsite emissions reduction plans are developed and executed.

DCCEEW emissions projections indicate that over the next couple of years, declining baselines can be expected to reduce SMC issuances and increase total ACCU and SMC surrenders until facilities deliver the required decline in emissions from investment in low emissions intensive technology. The CER has seen increased investments in emissions reduction projects and will continue to track, analyse and publish de-identified information about safeguard entities' compliance strategies, including for onsite abatement.

Holdings in the ANREU fell from 49.9 million at the end of 2024 to 46.0 million at the end of Q1 2025, excluding the cost containment measure. This reduction was driven by surrenders made by safeguard entities over the quarter. Holdings in safeguard and safeguard related accounts fell by 3.3 million but still make up around 60% of all ACCU holdings. In addition, around 0.4 million ACCUs were delivered to the Commonwealth over the same period, increasing the cost containment account to 4.2 million ACCUs.

Figure 1.1: Australian carbon credit unit (ACCU) holdings (in millions) by market participation



Market dynamics

Table 1: ACCU supply and demand summary for Q1 2025

	Q1 2025	
	Supply	**Demand**
Balance carried forward from Q4 2024	49.9m	
Change during the quarter:		
ACCU supply	+3.0m	
ACCU Scheme contract deliveries*		-0.4m
Non-Commonwealth cancellations		-0.2m
Safeguard surrenders^		-6.4m
Net balance at the end of Q1 2025	**46.0m**	
Cost containment measure	4.2m	

**This refers to ACCUs delivered under Commonwealth carbon abatement contracts in the quarter. These ACCUs are held in the cost containment measure. These ACCUs are available to eligible Safeguard entities for purchase at a fixed price of $79.20 for 2024-25. ^ Total safeguard surrenders for the 2023-24 compliance year were 7.1 m as some were surrendered in other quarters. Totals may not sum due to rounding.*

Table 2: SMC supply and demand summary for Q1 2025

	Q1 2025	
	Supply	**Demand**
Balance carried forward from Q4 2024	N/A	
Change during the quarter:		
SMC supply	+8.3m	
Safeguard surrenders		-1.4m
Net balance at the end of Q1 2025	**6.9m**	

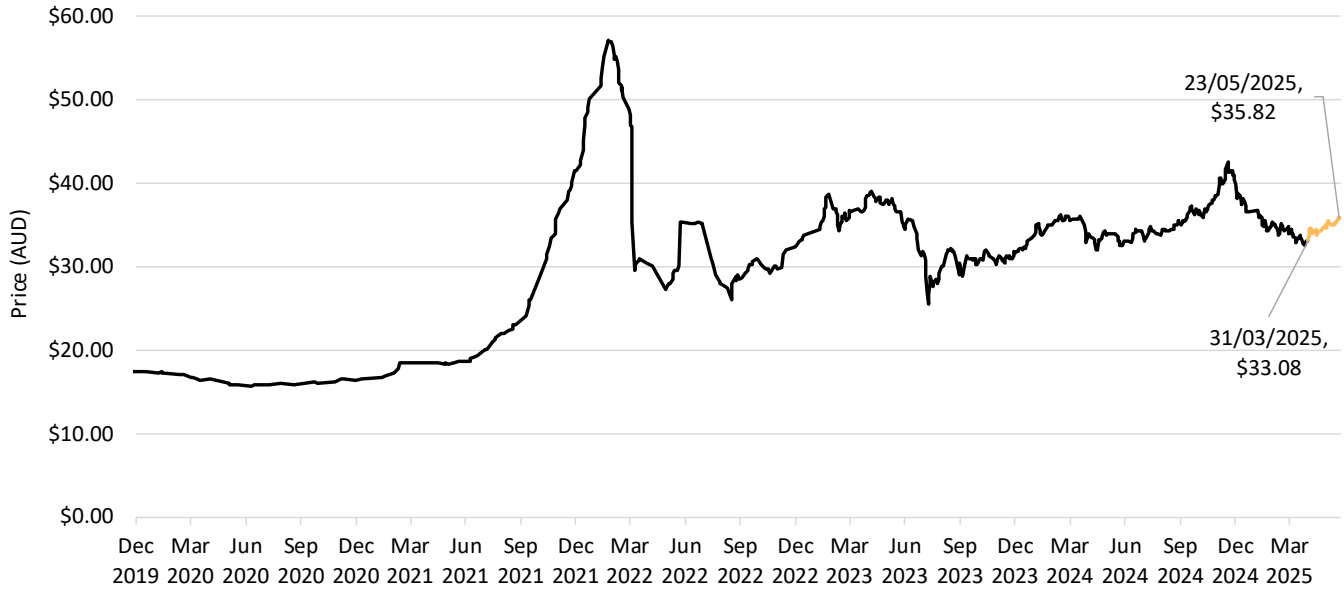
The generic ACCU weighted-average spot price fell from around $35 at the end of 2024 to around $33 by the end of this quarter. Prices recovered over April and May, reaching just under $36 by 23 May.

SMCs were transacted on the new Unit and Certificate Registry for the first time in Q1. A total of 32 transactions totalling 3.0 million SMCs, have been recorded since they were first issued into the Unit and Certificate Registry in January. 1.8 million SMCs appear to have been traded within related corporate entities to manage obligations across a corporate group.

The small volumes of SMC trades are in line with the CER's expectations, discussed in previous QCMRs, that most entities will surrender or bank their own SMCs in the early periods of the reformed Safeguard Mechanism to manage future obligations. SMC trades reported with a price were $0.50 - $2 lower than the generic spot price of an ACCU at the time. This differential likely reflects that ACCUs have alternative uses, including purchase and/or cancellation for voluntary purposes and corporate emissions reporting, while SMCs may only be surrendered for safeguard compliance purposes.

On 12 March, the CER announced that carbon abatement contract holders will be allowed to reschedule their milestone to the end of 2025. The outcomes of the fourth pilot exit window which closed on 31 December 2024 are informing Australian Government consideration of future exit arrangements, including whether they should be made permanent or varied.

Figure 1.2: Generic Australian carbon credit unit (ACCU) volume weighted average spot price



Safeguard Mechanism the primary source of ACCU demand

0.2 million ACCUs were cancelled for non-safeguard purposes in the first quarter. This was lower than the 0.3 million cancelled over the same period last year. ACCU cancellations for non-safeguard purposes do not follow a clear pattern. Typically, fewer of these cancellations are made in Q1, although this can fluctuate significantly.

A comparison of the ACCU methods used for safeguard surrender indicates these are broadly in line with the share of those methods in total holdings, including those accounts not associated with a safeguard entity. As would be expected, ACCU classes that trade without a price premium were favoured by entities seeking least cost compliance.

Figure 1.3: Australian carbon credit unit (ACCU) cancellations by demand source

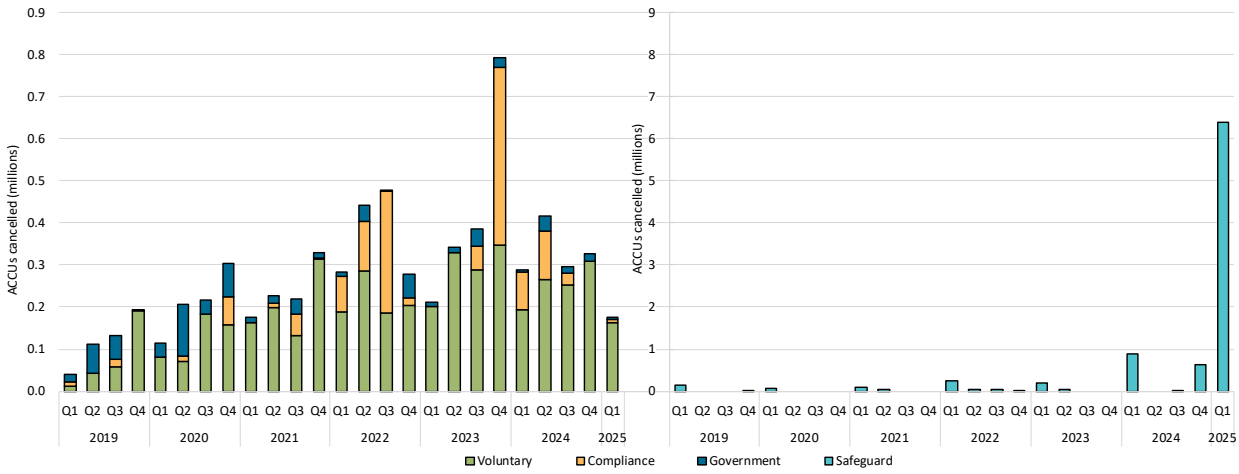
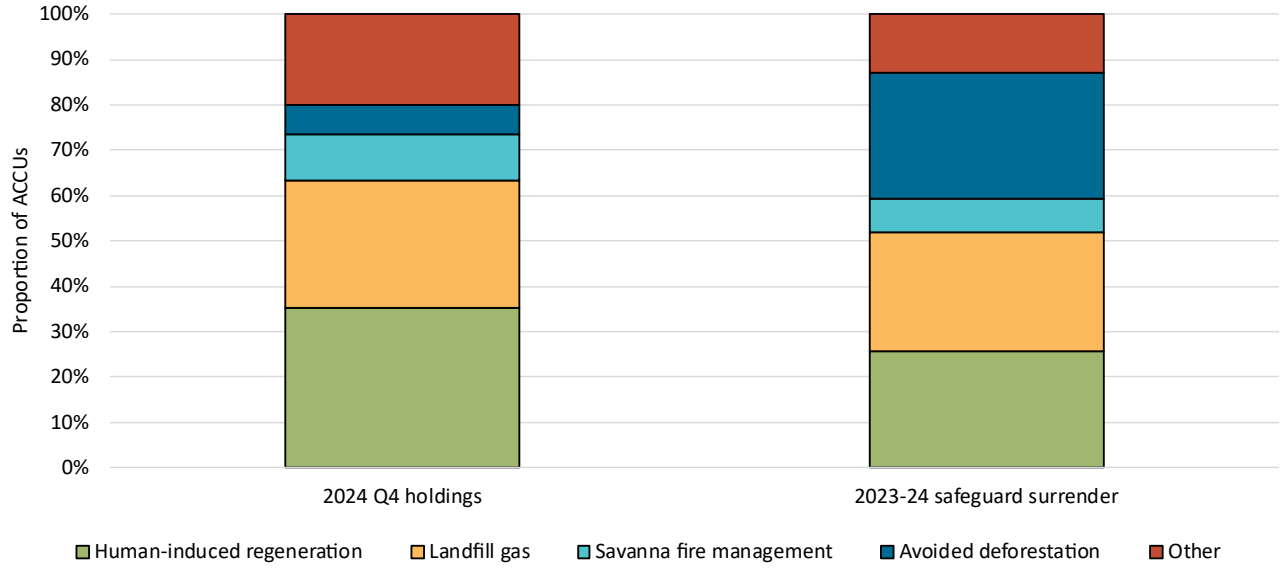


Figure 1.4: Total ACCU holdings and ACCUs surrendered for Safeguard compliance: comparison by method



ACCU issuances expected to lift over the rest of 2025

3.0 million ACCUs were issued in Q1, lower than the 3.8 million in the same period last year. Lower total issuances were largely driven by lower issuances to Waste projects as the CER processed registrations and method variations ahead of methods sunsetting on 1 April. This included waste methods such as the landfill gas and alternative waste treatment methods. The CER registered 89 projects in the quarter, including a record 14 waste projects. ACCU issuances to waste projects totalled 0.4 million this quarter, compared with 1.5 million in Q1 2024. The CER expects that a backlog of crediting applications for waste methods will be cleared throughout Q2.

Q1 also saw project registrations by safeguard entities. During the quarter a record 9 coal mine waste gas projects were registered ahead of the method sunsetting. These projects are linked to coal facilities covered by the Safeguard Mechanism. These ACCU projects relate to electricity displacement at safeguard facilities, but not to covered emissions under the Safeguard Mechanism. Facilities earning credits under these projects therefore will be able to generate ACCUs despite being covered by the Safeguard Mechanism and may choose to use the ACCUs for safeguard compliance.

Figure 1.5: Registered Australian carbon credit unit (ACCU) Scheme projects by method type

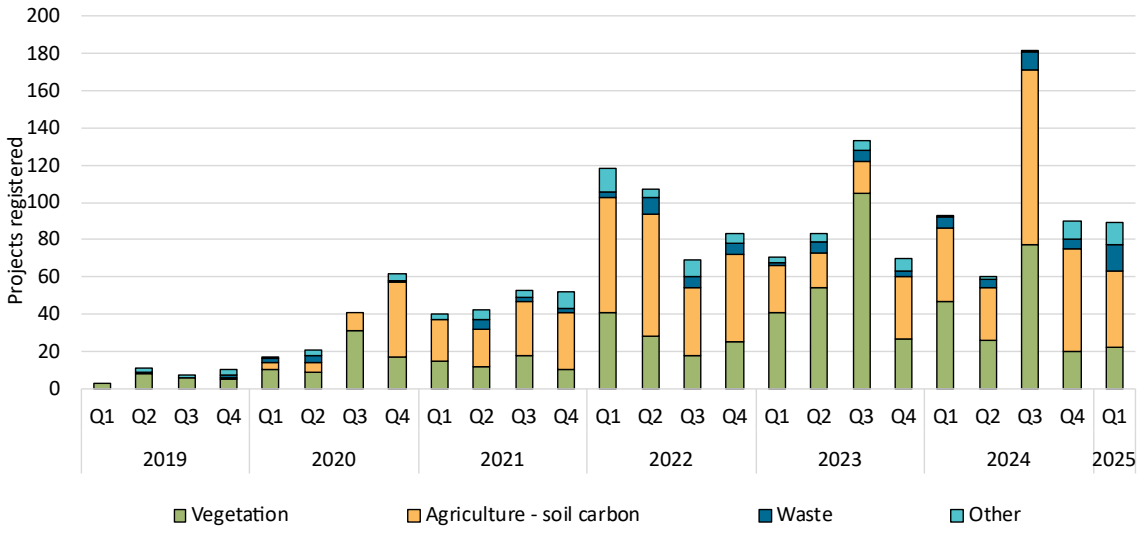
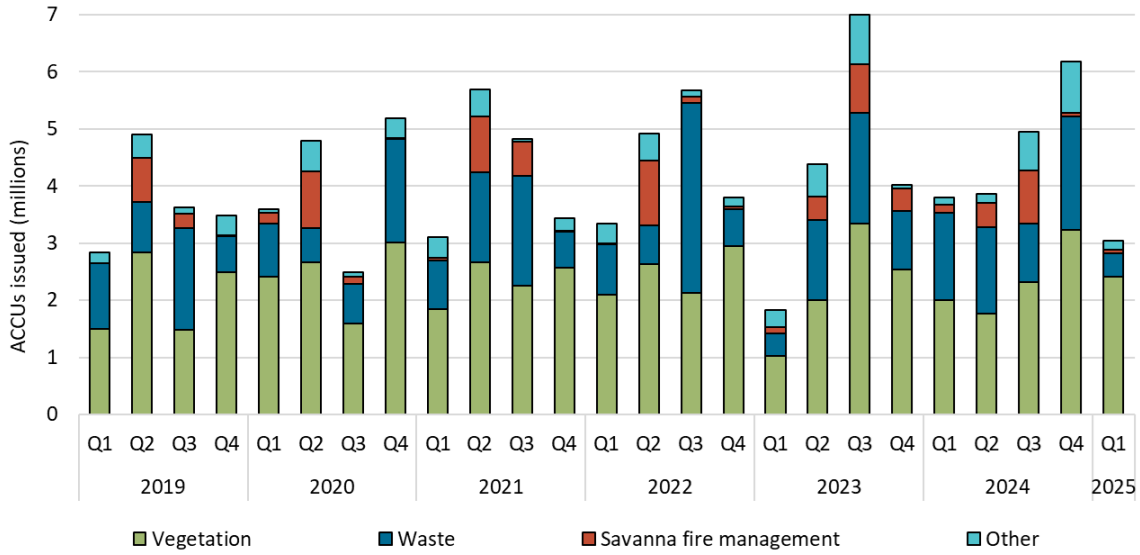


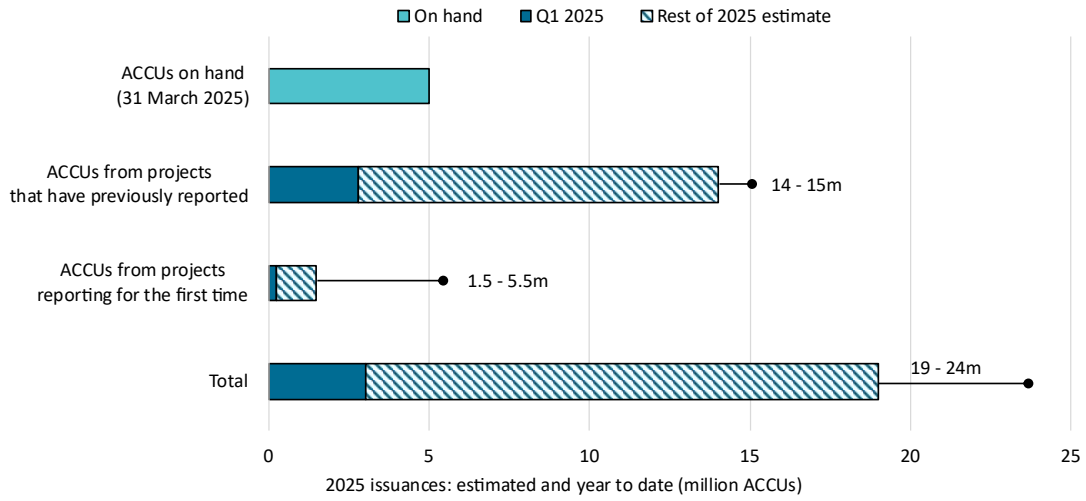
Figure 1.6: Australian carbon credit units (ACCUs) issued by method type



Issuances for the year remain on track to meet the CER's expected range of 19 to 24 million. The CER received high volumes of ACCU crediting applications in the first quarter. This, in combination with lower issuances, saw the volume of ACCUs claimed that could be issued ('ACCUs from claims on hand') increase from 3.7 million at the end of 2024 to around 5.0m by the end of the quarter. Issuances will increase over coming quarters as these claims are processed.

Looking forward, ACCU supply is expected to be influenced by new methods. As discussed in the previous QCMR, the Australian Government is developing 4 methods. The Emissions Reduction Assurance Committee released the new draft landfill gas method for feedback on 19 May. Once finalised, this method will help support ACCU supply as existing landfill gas projects reach the end of their crediting period. Exposure drafts for other department led methods are expected to be delivered over the course of 2025. Proponents are leading development of a further 4 new prioritised methods.

Figure 1.7: Estimated Australian carbon credit unit (ACCU) issuances in 2025



Increased transparency for the ACCU Scheme

The CER is committed to transparency for all its schemes. Recent amendments to the legislative rules underpinning the ACCU scheme supported by the CER mean that we can now make more project information available.

Due to legislative secrecy provisions, the CER can only publish legislatively required information on the ACCU project register. The rules underpinning the ACCU Scheme prevent the CER publishing any non-public data unless the data is already public or where disclosure is required or permitted. For example, data may be shared with specific government agencies to assist them in carrying out their statutory responsibilities.

The 2022 Independent Review of ACCUs recommended changes to strengthen transparency. The Australian Government agreed in principle to all recommendations from the Independent Review. Subsequent amendments made to the *Carbon Credits (Carbon Farming Initiative) Act 2011* and the Carbon Credits (Carbon Farming Initiative) Rule 2015 (CFI Rule) in April 2023 and December 2024 respectively. The amendments aim to underpin public trust in the ACCU Scheme by improving transparency.

Amendments to the CFI Rules were developed following public consultation and the data is being published in 3 stages in May, June and July. On 21 May, the CER added crediting period and permanence period dates to the project register.

These changes increase transparency by providing more clarity on how abatement is achieved and estimated. They will allow stakeholders to better inform their own analysis, including forecasts of ACCU supply, and to better perform due diligence.

Some of this information may be subject to change over time. For example, project proponents can apply to vary a project's crediting period start date, which may impact the timing of ACCU supply forecasts. These changes will be published on the project register as it is updated monthly.

The CER is also making it easier for project proponents to voluntarily release extra information about their projects. This information is published alongside the project register.

First Nature Repair Market method released

The first method under the Nature Repair Market was released on 1 March. Eligible projects under this method can earn a biodiversity certificate by improving biodiversity from replanting native forest and

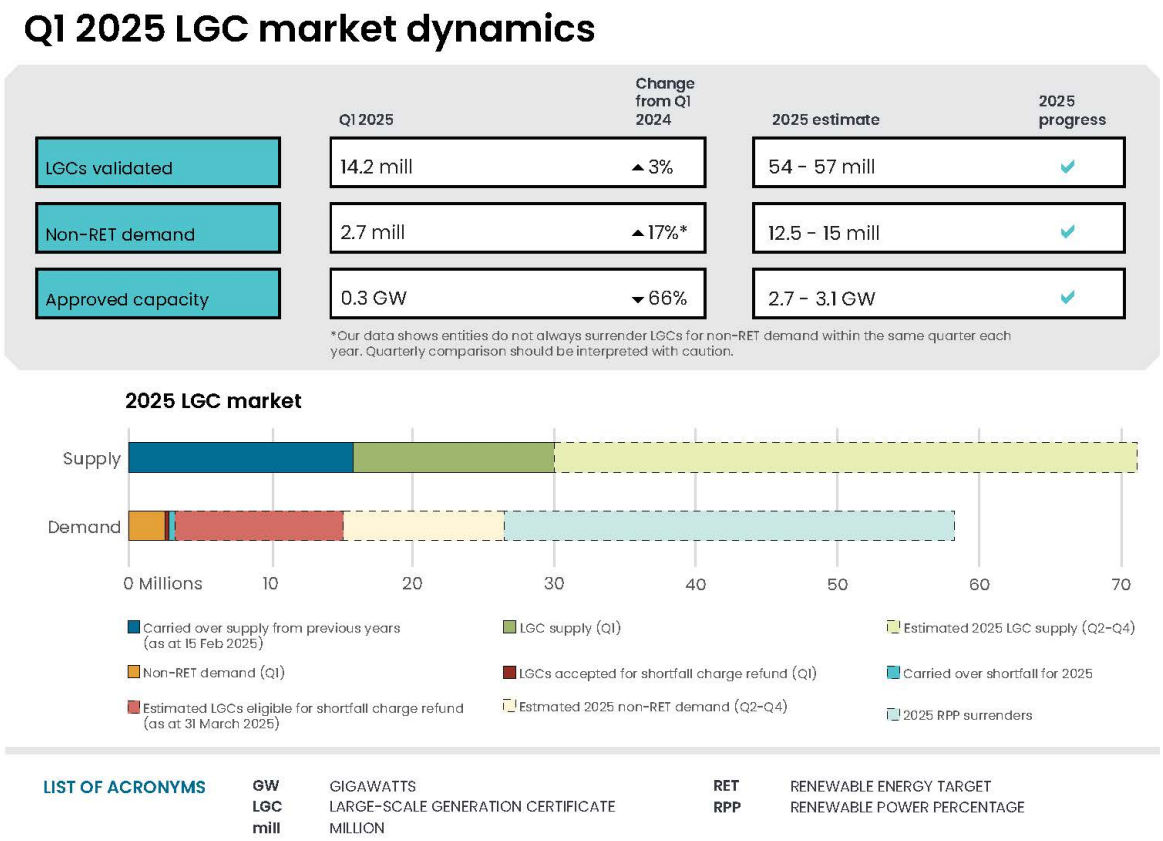
woodland ecosystems in previously cleared land. Proponents may be able to stack a biodiversity project with an ACCU project if the respective legislative requirements for each scheme are met.

2. Large-scale generation certificates (LGCs)

Insights

- Large-scale renewable energy generation is setting records. Q1 2025 was a record Q1 for large scale electricity generation in both of Australia's major electricity grids.
  - » 14.2 million LGCs were created in Q1 2025, exceeding the previous record of 14.0 million set in Q4 2024.
  - » Renewable energy penetration in the National Electricity Market was 43% in Q1 2025. The penetration for the year could be as high as 46% dependent on demand and weather conditions.
- Capacity being added to the grid remains strong. This will translate into a greater proportion of renewable energy in the grid. 1.7 GW of total capacity was approved to 31 May and with 1.2 GW of applications on hand we expect to exceed the lower end of the projected 2.7 to 3.1 GW range for 2025.
  - » The investment pathway is healthy. Final investment decisions (FID) are inherently lumpy so while they were down in Q1 2025 compared to a strong Q4 2024, the total capacity under development remains high. Given the sizeable capacity of successful bids in Capacity Investment Scheme (CIS) tenders, total capacity reaching FID in 2025 could be around 6 GW or more.
- The market has shifted from supply and demand being tight to expectations that supply will exceed total demand (i.e. RET and voluntary) despite the latter growing. This is a product of the success of the RET in incentivising investment in large-scale renewables.
  - » As a result of this shift, we have seen LGC prices decline. LGC prices declined in Q1 2025 from $33 to $22.50 and then continued to decline post quarter to remain just above $21.
- The LGC price decline is unlikely to materially impact investment because the drivers of investment are changing. The CIS and outcomes following the review of the National Energy Market will dominate future investment decisions. Market intelligence suggests project developers are prepared for lower LGC prices.
- There is potential for substantial further growth in voluntary demand including from mandatory climate risk disclosures, and National Greenhouse and Energy Reporting voluntary market-based scope 2 emissions reporting. As such, both supply and demand for LGCs are expected to continue growing over the remaining life of the RET, with LGC prices adjusting to balance supply (including inventories) and demand. The CER will continue to analyse and report on these dynamics and the evolution of voluntary demand.

Image 2: Q1 2025 LGC market dynamics



Market dynamics

Table 3.1: Large-scale generation certificate (LGC) supply and demand balance

	LGCs (millions)	
	Supply	**Demand**
Supply carried over from previous years (as of 15 Feb 2025)	15.9	
LGC supply (Q1 2025)	+14.2	
Estimated 2025 LGC supply (Q2-Q4 2025)	+39.8 to +42.8	
Non-RET demand (Q1 2025)		-2.7
Estimated 2025 non-RET demand (Q2-Q4 2025)		-9.8 to -12.3
2025 RPP surrenders (before any shortfall)		-32.0
LGCs accepted for shortfall charge refund (Q1 2025)		-0.3
Estimated shortfall charge refund (Q2-Q4 2025)		-4.1
Carried over shortfall for 2025 (less than 10% of liability)		-0.4
Estimated balance as of 15 Feb 2026^	**20.6 to 21.1**	

Notes: There is a total of 12.0 million LGCs in shortfall that are eligible for shortfall refunds to be claimed, representing $780.2 million in consolidated revenue.
Estimated 2025 LGC supply, and non-RET demand (Q2-Q4) based on the range of CER estimates for 2025 LGC creations (54 to 57 million) and non-RET surrenders (12.5 million to 15 million) after subtracting Q1 2025 figures.
^Sum of all supply items, less the sum of all demand items. This assumes no further shortfall is taken for the 2025 compliance year.

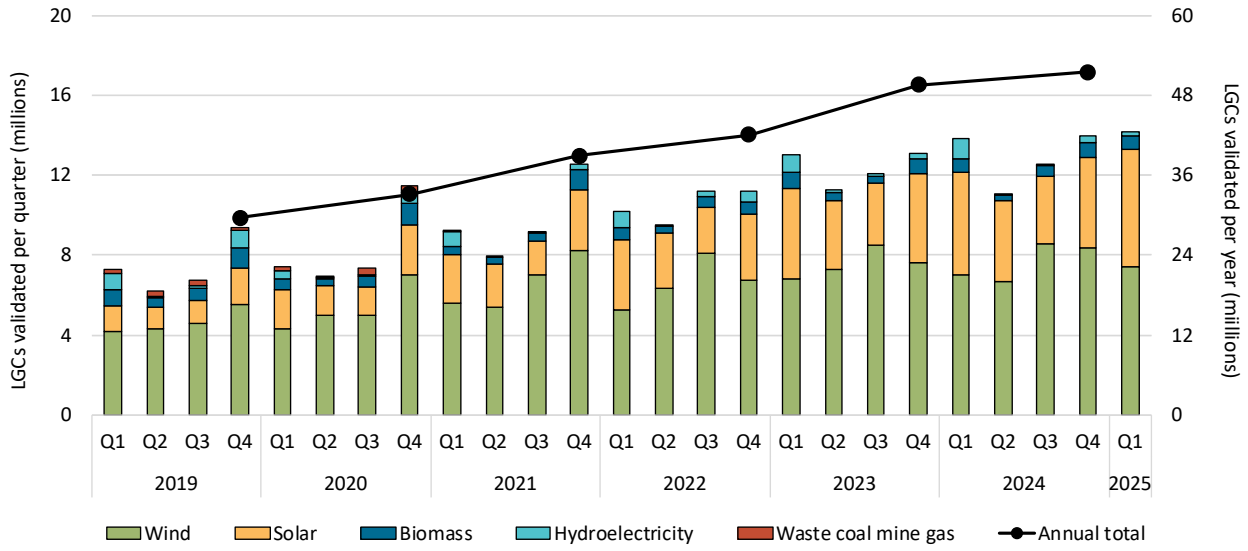
LGC creations are a function of eligible installed generation capacity and how much of that capacity is used to produce electricity, which in turn is affected by weather conditions and economics.

In Q1 2025, large scale solar and wind generation contributed about 14 TWh to the National Electricity Market (NEM) and the South-West Interconnected System (SWIS) in Western Australia. 14.2 million LGCs were created, a small increase compared to the 13.8 million created in Q1 2024 and a new overall record. With average weather over the remainder of 2025, annual LGC creations are currently tracking towards the higher end of our projection of 54 million to 57 million certificates compared to 51.5 million in 2024.

Wind, solar and biomass technologies saw growth in LGC creations compared to Q1 2024, while hydro saw a decrease of 78%. The decline in hydro generation was driven by reduced generation in NSW and Tasmania. This reflects below-average rainfall in NSW and parts of Tasmania throughout the summer months.

Overall shares of renewable generation depend on total renewable generation and electricity demand. (Total renewable generation includes some capacity pre-dating the Renewable Energy Target and therefore ineligible to create LGCs.) In Q1 2025 in the NEM, data from the Australian Energy Market Operator shows that renewables provided a record Q1 average of 43% of the generation mix, exceeding the previous Q1 record of 39% in Q1 2024. Grid-scale solar generation reached an all-time high of 9.3% and wind generation a new Q1 high of 13.7%, both driven by new and commissioning facilities. Western Australia's SWIS also set a record for average Q1 renewable generation, at 41.7%.

Figure 2.1: Large-scale generation certificates (LGCs) validated by technology type



The LGC spot price peaked at $33.00 early in the quarter before dropping 32% to end Q1 2025 at $22.50. The decline in the spot price has continued into Q2, sitting at $21.25 on 23 May 2025.

LGC futures prices have followed a similar trend over the quarter and afterwards. Cal26, 27 and 28 vintages finished the quarter at $21.75, $15.00, and $15.50 respectively, while the Cal25 ended higher than spot ('in contango') at $23.75.

Overall, LGC supply exceeds expected compliance and non-RET demand, even with robust growth in voluntary demand. The RET and other policies have incentivised large-scale renewables investment with around 55,500 GWh of renewable generation expected this year, well above the RET's 33,000 GWh target. The RET will cease in 2030, and other policy settings are in place or are being considered to drive investment decisions and certify renewable generation. LGC supply and demand are discussed further in Box 1 and certification under the Renewable Electricity Guarantee of Origin scheme is discussed further below.

LGCs available for shortfall refund evenly spread across vintages

Liable entities have the option of paying a shortfall charge of $65 per LGC rather than surrendering certificates. This shortfall charge is refunded if the outstanding LGCs are surrendered within 3 years of paying the shortfall charge.

Taking shortfall is attractive if the difference between the LGC spot price and expected future LGC prices is wide enough to cover the costs of taking the position. The cost of taking the position effectively increases as the gap between the LGC spot price and the $65 shortfall charge increases because the shortfall charge is not tax deductible until redeemed. The estimated LGC balance at the end of the 2025 compliance year of 20.6 to 21.1 million assumes for simplicity that liable entities do not take shortfall. Given the observed decline in LGC prices, it will be interesting to see whether any further material shortfall is taken.

In a market where LGC prices are expected to fall over time, entities will typically surrender refunds in the last year possible, although this can vary based on financial positions. Liable entities usually lock in the prices they will pay for the LGCs they need to surrender in the future through power purchase agreements (PPAs) and futures contracts. This means they are less likely to be affected by spot price uncertainty.

The table below shows the breakdown of LGCs eligible for shortfall charge refunds by compliance year at the end of Q1 2025. On current expected price paths, early redemption of shortfall charges may be less likely. In that case the 4.1 million LGCs from 2023 and the 3.8 million from 2024 would be surrendered in 2026 and 2027, respectively.

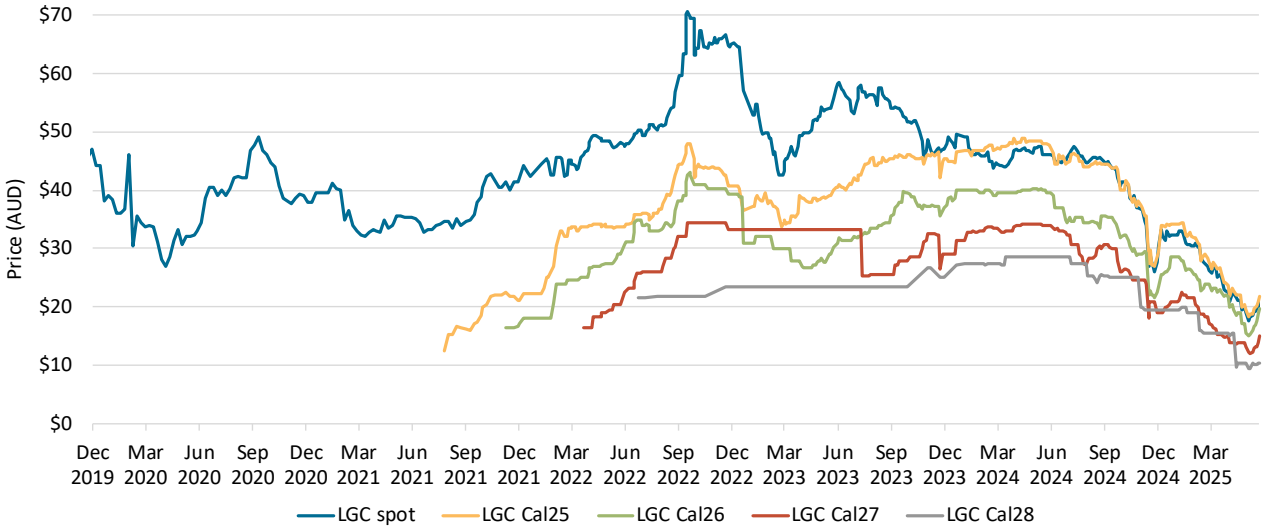
Table 3.2: LGC shortfall refunds per year

	2022	2023	2024	Total
LGCs Eligible	4,093,817	4,072,318	3,837,613	**12,003,748**
Refund Eligible	$266,098,105	$264,700,670	$249,444,845	**$780,243,620**

Looking beyond the current shortfall vintages, since the start of Q3 2024, the price difference between Cal27 and Cal28 futures and the LGC spot price has tightened. This makes taking a shortfall position for RET compliance over those periods less financially attractive, other things equal.

Figure 2.2: Large-scale generation certificate (LGC) spot price

Figure 2.3: LGC reported spot and forward prices



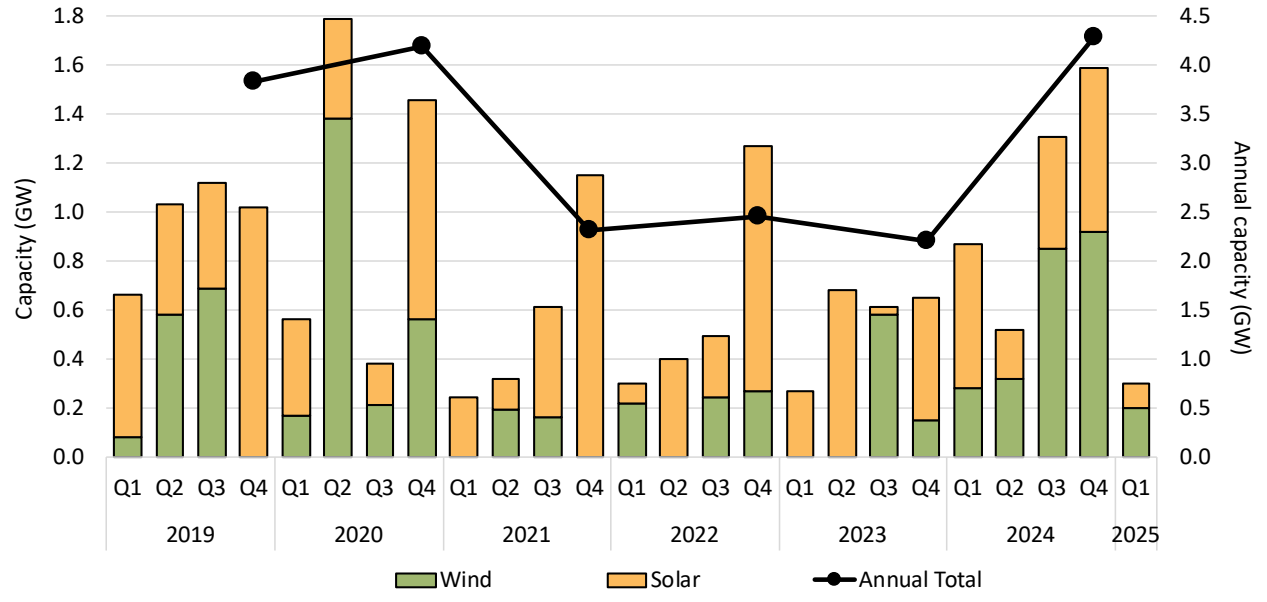
Approvals lower in Q1 but pipeline healthy

In Q1 2025, 0.3 GW of renewable capacity was approved to generate LGCs. This included the approval of Goyder South Wind Farm, adding 196 MW of capacity at the end of the quarter.

- In Q2, the 520 MW Stubbo solar farm, the 346 MW Wollar solar farm, and the 450 MW Clarke Creek wind farm have been approved so far. These three power stations are over four times the total approved capacity in Q1 2025.
- As of 31 May, there is about 1.2 GW of large-scale capacity under assessment by the CER.

In the Q4 2024 QCMR we estimated an additional 2.7 to 3.1 GW would be approved in 2025. So far, around 3.0 GW are already approved or under assessment, indicating a healthy pipeline. On this basis, we expect to exceed the 2.7 GW lower bound of our conservative range for additional large-scale renewable capacity.

Figure 2.4: Approved large-scale wind and solar capacity



Box 1: Supply and demand for LGCs, and implications for price and investment

The Large-scale Renewable Energy Target (LRET) has been successful in incentivising investment in large-scale renewable energy projects, with over 30 GW of large-scale generation capacity added to the grid since 2001.

Strong investment in large-scale renewable energy over the past 4 years has seen annual LGC creations grow to an expected 54 to 57 million this year. The demand for these certificates comes from liable entities (largely electricity retailers) meeting their share of fixed annual scheme targets, plus demand from other entities for voluntary or other purposes ('non-RET' demand). The market is now confident that annual supply, in combination with increasing residual LGC volumes in the certificate registry, can readily account for expected demand. This has resulted in downward pressure on LGC prices as expected.

Sources of supply and demand

In 2015, the annual scheme target was set to 33,000 GWh per year from 2021 to 2030. This means annual liabilities are essentially stable to scheme end 2030. However, the supply of LGCs grows each year because all new large-scale renewable generation approved by the CER can create certificates. From Q1 2021 to Q1 2025, an additional 11.6 GW of wind and solar capacity has been added to the grid, representing 38% of all large-scale renewable energy generation capacity added since the introduction of the LRET.

Non-RET surrenders started in 2017 with just 33 entities surrendering fewer than 1 million LGCs. This has grown to nearly 200 entities surrendering more than 10 million LGCs last year. There are 3 categories of non-RET demand:

- non-RET (voluntary): private enterprises surrendering LGCs to meet environmental, social, and governance targets
- non-RET (compliance): private enterprises surrendering LGCs as required by local, state, or territory regulation or legislation
- non-RET (government): government entities surrendering LGCs to meet renewable energy or other climate targets.

Private voluntary demand is the largest source of non-RET demand, growing to represent 14% of all annual LGC demand in 2024. There is potential for substantial further growth in demand including from mandatory climate risk disclosures, National Greenhouse and Energy Reporting voluntary market-based scope 2 emissions reporting, and observed reductions in LGC prices. One estimate from ACIL Allen in 2024 projected annual voluntary LGC demand to grow from its current level of around 10 million to 26 million in 2030. Given the substantial potential upside for voluntary demand, it will be interesting to see at what price the increasing supply is matched by increasing demand. Non-RET demand is discussed further in Box 2.

Shortfall surrenders can also be a significant source of demand, for example representing 15% of demand in 2024. As discussed above, subject to certain conditions, liable entities can pay a 'shortfall charge' and surrender LGCs within 3 years to claim a refund of the charges. These surrenders do not increase cumulative compliance demand over the life of the scheme but rather can shift the demand across time.

The relative size of recent supply and demand are shown in the figure below. In the earlier years of the decade, the balance between LGC supply and demand remained tight due to growth in voluntary LGC demand, and the surrender of LGCs for shortfall refunds. These

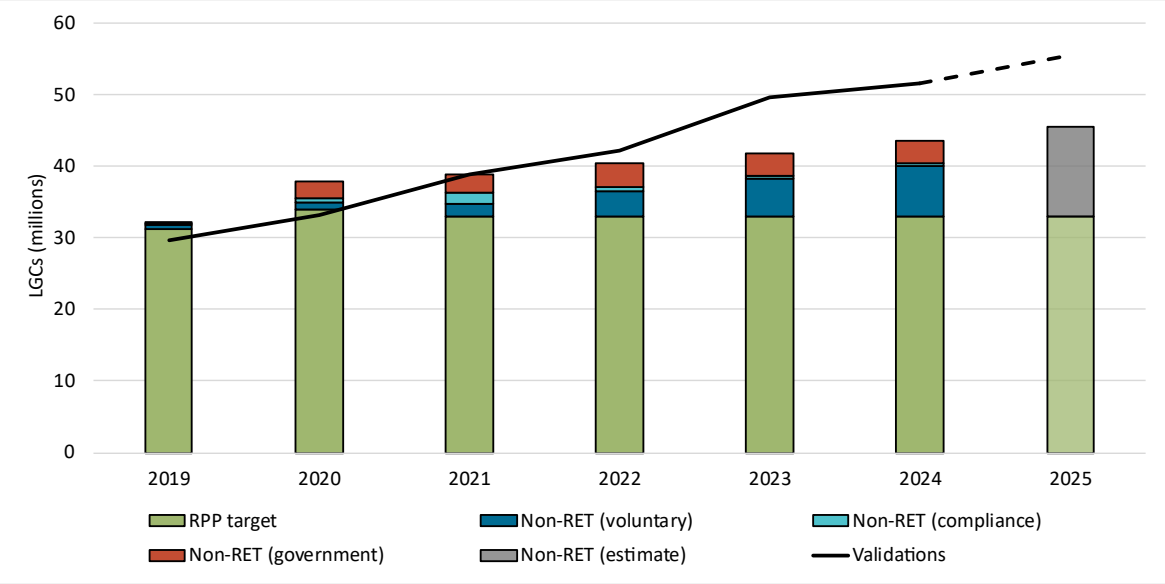
demand factors allowed a high LGC price to be maintained despite the fixed annual compliance target.

Potential impacts

In the short term, the reduction in LGC prices is not anticipated to have a significant impact on investment decisions by project developers. Renewable energy projects typically sign PPAs with third parties prior to reaching a final investment decision (FID). PPAs hedge projects from price risk in the open LGC market, meaning the effects of the price downturn on their finances will be minimal.

Market intelligence also suggests that developers are not concerned about the decline in LGC prices over longer horizons: their financial planning is based on assumptions of low certificate prices, and a suite of other policies such as the Capacity Investment Scheme (CIS) and state-based schemes are supporting investment.

Figure 2.5: LGC validations compared to LGC demand



2025 may be a record for capacity reaching FID despite a modest Q1

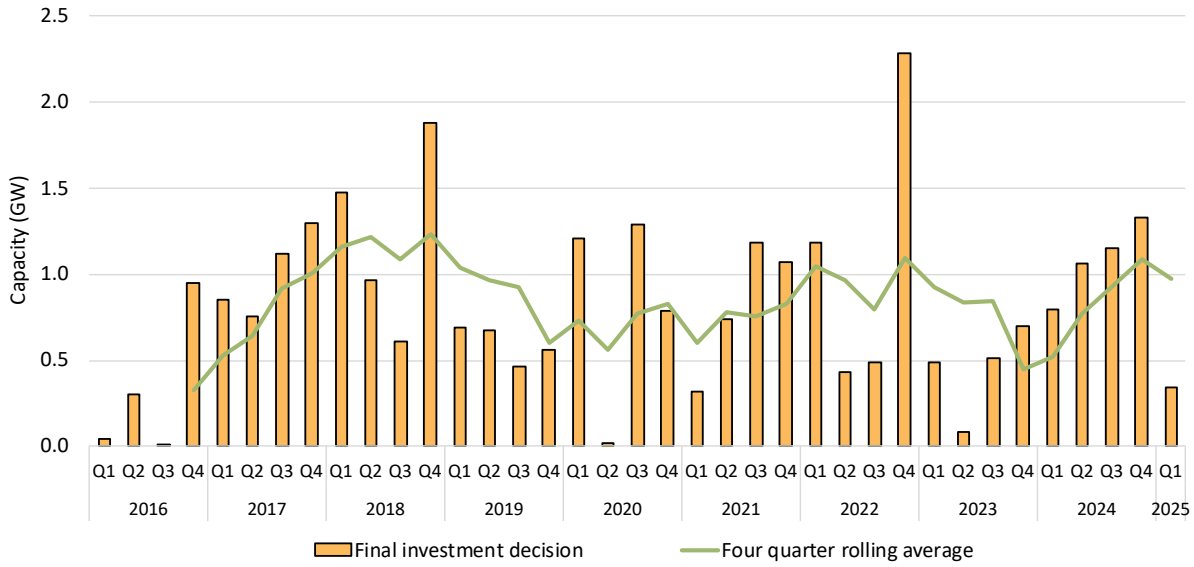
In Q1 2025, 2 projects with a total of 0.4 GW of capacity reached final investment decision (FID): the 280 MW Bungama Solar Farm Stage 3 near Port Pirie and the 106 MW Lancaster Solar Farm west of Shepparton. The Bungama Solar Farm also includes a 250 MW/500 MWh battery. This compares to 1.4 GW of capacity that reached FID in Q4 2024. As discussed in the Q4 2024 QCMR, the timing of FID and first generation for large renewables projects are inherently lumpy.

The CIS is continuing to support investment in large-scale renewable energy projects. Successful Tender 1 projects remain subject to the signing of a Capacity Investment Scheme Agreement (CISA) with the Australian Government. Revenue underwriting agreements available to projects supported through finalised CIS contracts are expected to increase the likelihood of reaching financial milestones such as FID in less time. Given the sizeable capacity of successful bids in Tender 1, total capacity reaching FID in 2025 could be around 6 GW or potentially more.

Two hybrid solar-storage projects with a combined generation capacity of 520 MW were among the 4 successful storage projects in in CIS Tender 2 – Wholesale Electricity Market (WEM) Dispatchable Capacity – 120 MW from Waroona Renewable Energy Project, and 400 MW from Boddington Giga Battery.

Stage B of CIS Tender 3 – National Electricity Market (NEM) Dispatchable, seeking 4 GW of projects, opened on 20 March 2025 and closed on 1 May 2025, while Stage A of CIS Tender 4 – NEM Generation, seeking 6 GW, closed on 18 February. The outcome of CIS Tender 3 is scheduled to be announced in Q3 2025, while stage B of CIS Tender 4 opened on 5 May and will close on 5 June with the outcome scheduled to be announced in October 2025. To date, all CIS tenders have been oversubscribed, indicating a strong pipeline of renewable energy projects. This trend is expected to continue for future tender rounds.

Figure 2.6: Final investment decision capacity (GW) for large-scale renewable generation

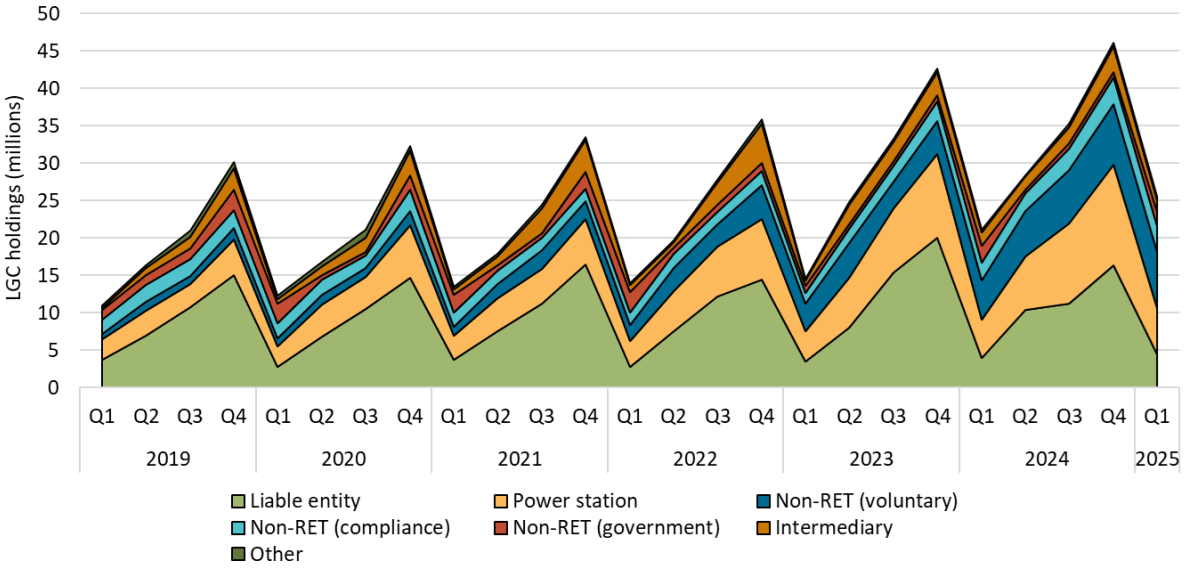


Strong start to non-RET demand in Q1

LGC holdings were 25.4 million at the end of the quarter, an increase of 20% from the Q1 2024 total of 21.1 million LGCs. Around half of this increase has been driven by non-RET (voluntary) entities. These holdings ended Q1 2025 at 7.4 million and make up 29% of total holdings, up from 25% in the same quarter last year.

Holdings in the non-RET (compliance) also grew significantly, rising by 45% (1.1 million LGCs) compared to the same quarter last year. These entities are private enterprises who are required to surrender LGCs to comply with regulatory requirements set by local or state and territory governments. Surrenders by non-RET (compliance) entities can be lumpy year to year as some entities conduct multi-year surrenders.

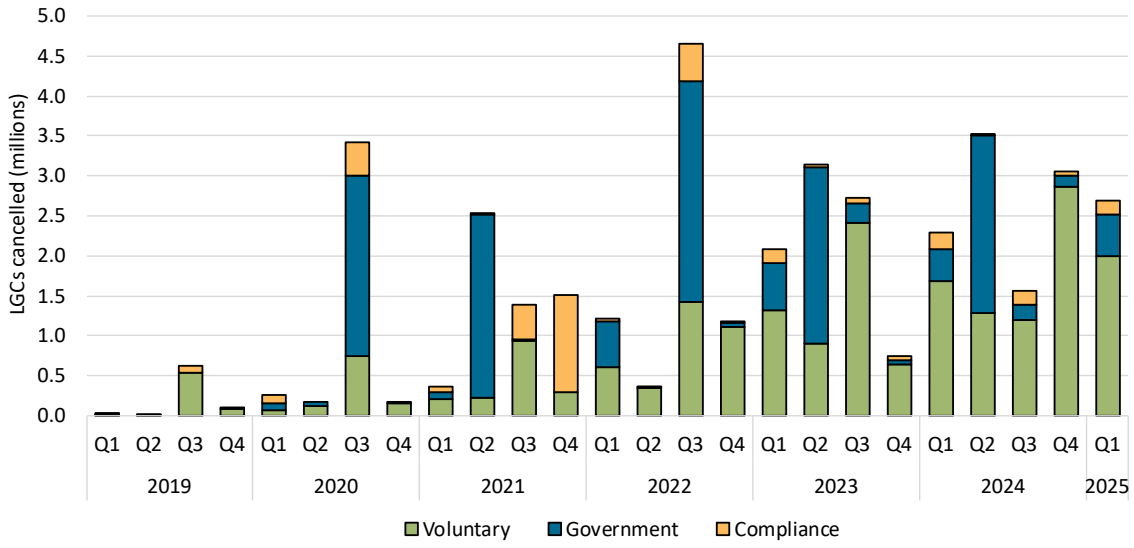
Figure 2.7: Large-scale generation certificate (LGC) holdings (in millions) by market participation



2.7 million LGC were surrendered for non-RET purposes in Q1 2025, with 2 million coming from non-RET (voluntary) accounts. This represents an 18% year-on-year increase compared to Q1 2024. As discussed in the Q4 2024 QCMR, we expect significant voluntary surrenders in Q3 2025, and an estimated 12.5 to 15 million total surrenders in 2025. Box 2 explores 2024 voluntary surrender and potential responses to lower LGC prices.

The CER will continue to monitor non-RET demand over 2025 and provide further analysis of this market and updated estimates of total non-RET demand throughout the year.

Figure 2.8: Non-Renewable Energy Target (non-RET) large-scale generation certificate (LGC) cancellations by demand source



Box 2: Non-RET voluntary surrenders in 2024 and insights for future voluntary demand

Analysis of 2024 non-RET surrenders data can help understand how this market segment might respond to sustained lower LGC prices. Last year, 191 entities surrendered 10.4 million LGCs, with the vast bulk surrendered by a small number of entities:

- Almost 70% of surrenders (7.1 million) were from 24 entities. Each of these surrendered more than 100,000 LGCs.
- Almost all the remaining 30% (3.1 million) were surrendered by 77 entities surrendering between 10,000 and 100,000 LGCs.
- The remaining 0.2 million surrenders were from the largest cohort of 90 entities, surrendering below 10,000 certificates each.

Lower LGC prices would be expected to generate increases in voluntary purchases of LGCs, other things equal. There are 2 potential sources of this increased demand:

- New entrants. The impact of new entrants on total demand will be modest unless large numbers or new large players enter the market. Last year, new entrants surrendered lower average LGC volumes than established participants. In 2024, 1.0 million LGCs were surrendered by 48 entities who surrendered for the first time. The average number of LGCs surrendered by these entities was around 21,500 with a median of around 3,000.
- Increased purchases from existing participants. It is possible that lower prices could make increases in voluntary climate targets more appealing. Expectations of sustained price declines could, conversely, encourage delays in purchases if entities already have sufficient holdings to acquit their 2025 voluntary targets.

Renewable Electricity Guarantee of Origin Scheme to start this year

The REGO scheme will certify renewable electricity from an expanded set of sources starting in the second half of 2025. REGO is one part of the Guarantee of Origin (GO) scheme which also includes the Product Guarantee of Origin scheme commencing with hydrogen from electrolysis. REGO certificates will be tradeable like LGCs. REGOs will also provide additional value as certificates will have greater detail on when the certified electricity was generated. There is already market interest for this capability. Unlike the RET, there are no annual scheme targets.

There will be 3 categories of eligible REGO facility: renewable electricity facilities (power stations that generate electricity from an eligible renewable source), energy storage systems (facilities capable of storing and dispatching electricity), and aggregated systems (multiple generation or storage systems under a single facility). In future, aggregated systems may be able to certify aggregated small-scale systems once rules are legislated. Renewable power stations that are already registered under the LRET may register in the REGO scheme as accredited power station facilities, a sub-type of renewable electricity facility.

Renewable electricity facilities and energy storage system facilities will be able to register from scheme commencement. Aggregated systems will be available for registration once rules are available. During the period to 2030 that both schemes are operational, accredited power station facilities, which are already registered in LRET, will be able to choose to create either LGCs or REGOs for each unit of electricity. It is expected LGCs will be preferred over REGOs unless the buyer of the electricity requires time stamping as LGCs can be used for both RET obligations and voluntary surrenders. The CER will cover REGO market dynamics in the QCMR from scheme commencement.

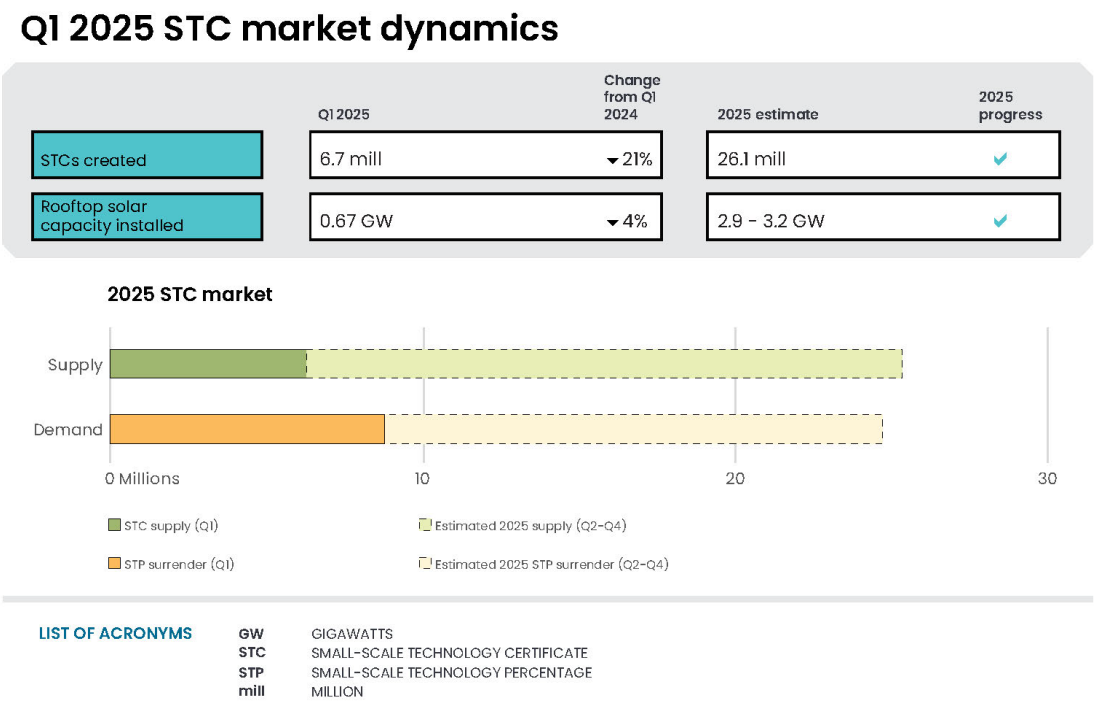
In the National Electricity Market, the LRET and REGO schemes will operate in the context of overall wholesale market settings. Appropriate settings to promote investment in firmed renewable generation and storage capacity following the conclusion of the Capacity Investment Scheme tenders in 2027 are currently under expert review. The NEM wholesale market settings review panel will produce recommendations for consideration by Energy Ministers through the Energy and Climate Ministerial Council.

3. Small-scale technology certificates (STCs)

Insights

- The Cheaper Home Batteries Program will commence from 1 July 2025, subject to regulations being in place. The Program is intended to provide a discount of around 30% on the cost of a typical installed battery. The discount will be implemented through the creation of STCs under the Small-scale Renewable Energy Scheme (SRES).
  - » STCs equivalent to the additional creations for batteries will be regularly purchased by government through the Clearing House.
- The intended eligibility criteria for the batteries program have been published by the Department of Climate Change, Energy, the Environment and Water (DCCEEW). The CER will publish emerging insights and data on battery installations in future QCMRs.
- While solar photovoltaic (PV) capacity and installations were 4% and 10% lower than the same quarter last year, average weekly STC creations in Q1 exceeded those required to meet the 2025 Small-scale Technology Percentage. With reports of strong order books, we expect activity to pick up as 2025 progresses.
  - » The impact of severe and widespread weather events throughout Queensland and northern NSW correlates with low installation figures over the quarter. For example, the week that Tropical Cyclone Alfred made landfall, QLD installations were 15% lower than the weekly average. The Cheaper Home Batteries Program could lift installation rates and capacity in the second half of the year.
  - » The average system size for rooftop PV is now almost 10 kW. Comparing Q1 2025 with Q1 2024, average system size has increased from 9.3 kW to 9.9 kW. This means total installed capacity remains strong despite lower installation numbers.
  - » Installed capacity remains on track to fall within the forecast range of 2.9 GW to 3.2 GW in 2025. We expect the industry will 'catch up' on installations hampered by severe weather and the new battery incentive brings on an increase in installations in the second half of the year.
- The STC spot price remained at $39.90 for most of Q1 2025. This was due to the Clearing House remaining in deficit for most of the quarter, only moving into a surplus post the Q4 2024 surrender deadline on 14 February 2025.
- We provide analysis in the chapter on an opportunity for further emissions reductions. Only 7% of installs in 2024 were for small commercial sized PV which accounted for approximately 20% installed capacity due to larger system size.
- Air source heat pump (ASHP) installations are down around 33% when compared to Q1 last year. This decline is being driven by an 84% reduction in installation rates in NSW, likely the ongoing effect of changes to the NSW Household Energy Saving Upgrades scheme.

Image 3: Q1 2025 STC market dynamics



Market dynamics

STC creations exceeded the rate required to meet the 2025 small-scale technology percentage (STP). In Q1 2025, the average weekly STC creation rate was over 509,000. The 2025 STP target is 26.1 million STCs, equivalent to creations of 502,000 STCs per week.

Throughout the quarter, 6.7 million STCs were created and 7.0 million were surrendered to meet the Q4 2024 surrender requirement due 14 February 2025. With a starting Q1 stock of 3.5 million, this left 2.9 million in the REC Registry after the surrender date.

The STC spot price remained at $39.90 for most of Q1 2025. This was due to the Clearing House remaining in deficit for most of the quarter, moving into a surplus toward the end of the quarter.

Shortly after the end of Q1, activity in the market increased as entities prepared for the Q1 surrender deadline on the 28 April. A total of 8.8 million STCs, equivalent to 35% of the annual compliance requirement were surrendered. Immediately following this surrender period, there were 1.4 million STCs remaining in the REC Registry. Between 15 February and the 28 April surrender, 6.6 million STCs were purchased from the Clearing House, pushing it into deficit by 4.6 million. As a result, the STC market price moved closer to the market cap of $40.

Cheaper home batteries to be delivered through the SRES

The Australian Government has announced the Commonwealth Cheaper Home Batteries Program. Batteries installed with new or existing solar PV systems will be eligible to create STCs from 1 July 2025, which will provide a discount of around 30% of the typical battery cost. The program requires regulations being in place. Further details on eligibility and the rate of STCs that may be created per kilowatt-hour of battery capacity are available on DCCEEW's website.

STCs equivalent to the additional creations for batteries will be regularly purchased by government through the Clearing House. The obligations of liable entities under the SRES – generally electricity retailers – will not be affected, so the cost of the Cheaper Home Batteries Program will not be passed through to electricity prices.

The SRES battery rebate will help to reduce the payback period for batteries. Payback times for home batteries vary based on location, electricity tariff, battery cost and model, and household energy consumption—especially at night. According to market sources, a 10 kWh battery installed for $8,500 after the SRES rebate and paired with a solar system larger than 7kW could deliver around $1,000 in annual savings in Sydney. Under this example, the SRES rebate would reduce the payback period from around 12 years to 8 before any further state government incentives. Payback times will be shorter still where state or territory incentives are available, such as in NSW, NT, WA, and the ACT.

In addition to substantial reductions in household energy bills, batteries can also help improve grid stability. Australia's world-leading solar penetration can cause events when more rooftop solar generation is exported than there is demand, making the system frequency too high. Storing excess PV output for later use rather than export could mean avoiding the use of backstop mechanisms that temporarily dial down or disconnect rooftop solar systems as a last resort, and charges by some network distributors for households exporting energy to the grid. Increasing volumes of household storage also help reduce the curtailment of other large-scale renewables by network operators to maintain power system security.

The information collected by the CER under the Cheaper Home Batteries Program will allow for a more accurate picture of battery uptake. Data and relevant insights will be included in future QCMRs and published on the CER website.

Figure 3.1: Weekly small-scale technology certificate (STC) supply and the required supply to meet the small-scale technology percentage (STP)

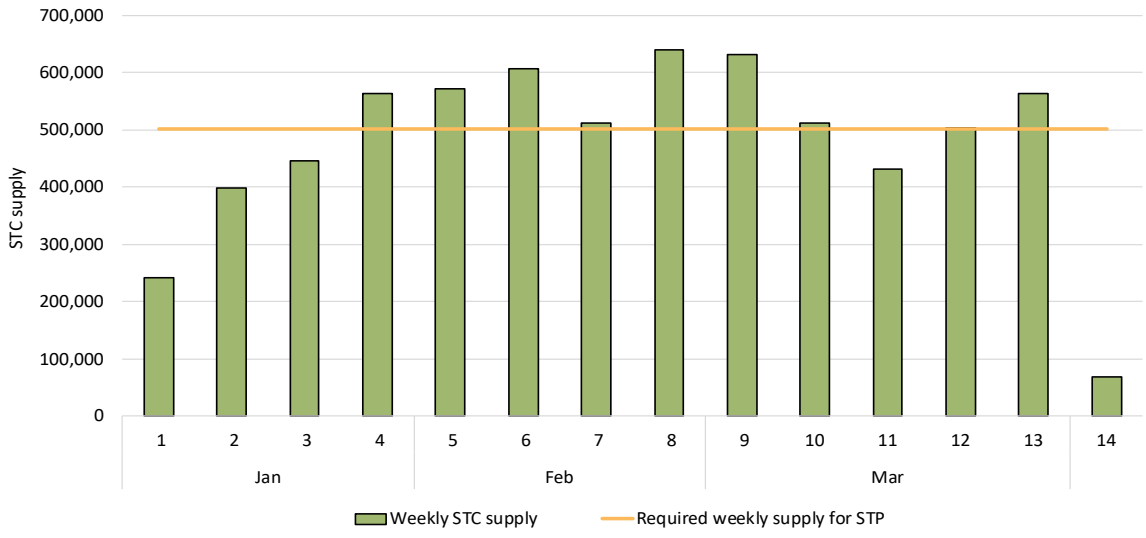
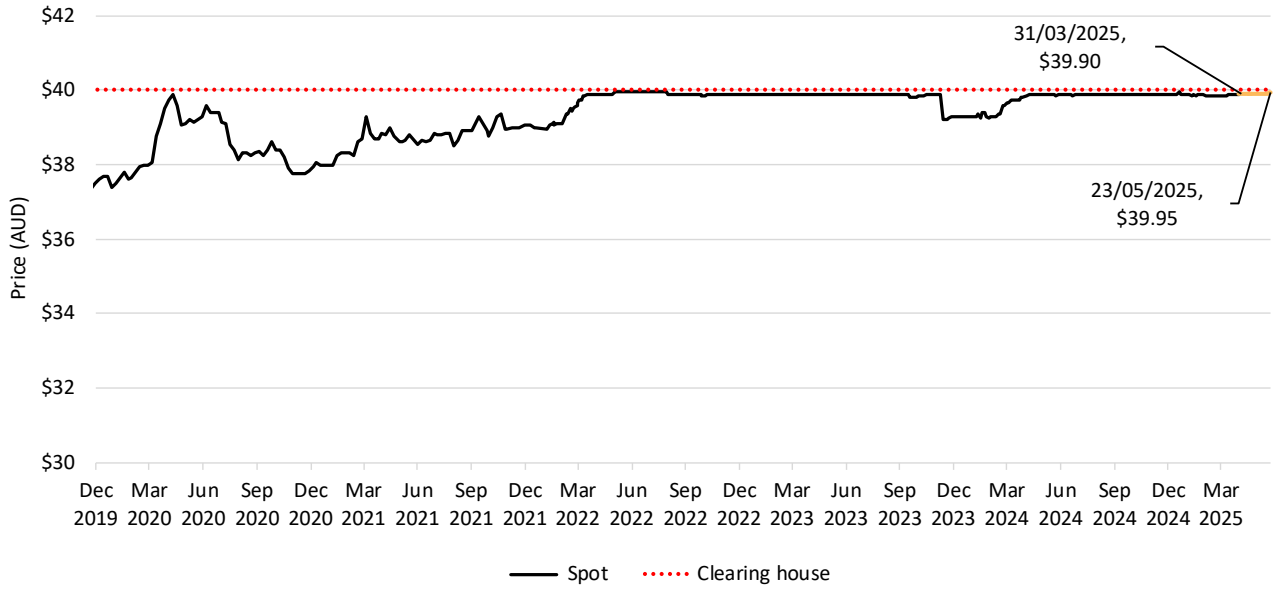


Figure 3.2: Small-scale technology certificate (STC) reported spot and clearing house prices



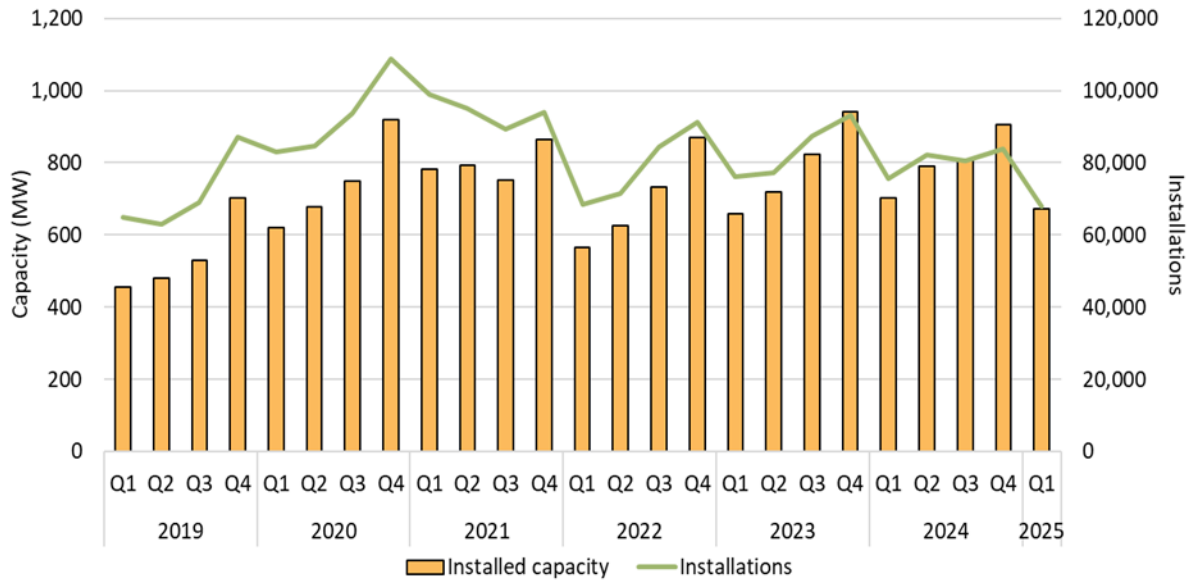
Soft start to 2025, with substantial pick-up expected

There has been a 4% decline in capacity and a 10% decline in installations when comparing Q1 2025 to Q1 2024. This national result was largely driven by reductions in the 3 states with the largest solar PV markets: NSW, QLD, and Victoria. Several factors may have contributed to the Q1 declines, including severe weather from Cyclone Alfred in southeast Queensland and northern NSW. Based on the experience with severe weather such as localised hailstorms, we expect the bulk of replacement installations from Cyclone Alfred to be creating STCs in Q3 2025.

More broadly, we expect the introduction of the Cheaper Home Batteries program to increase installations. The CER expects the program will incentivise installation of new PV systems; an uplift in system size for those who were already considering installing PV systems; and replacement systems for older systems. This is supported by current market intelligence suggesting that order books for installers have been improving since the program was announced.

Looking back to 2024, installed capacity looks to be a near record, with more than 3.1 GW of rooftop capacity installed. Given the 12-month period for creating STCs, the CER lag-adjusts actual estimates based on recent historical creation to estimate the final outcomes. Lag adjustments indicate 2024 capacity will reach a record 3.2 GW.

Figure 3.3: Small-scale rooftop solar installations and installed capacity in megawatts (MW)

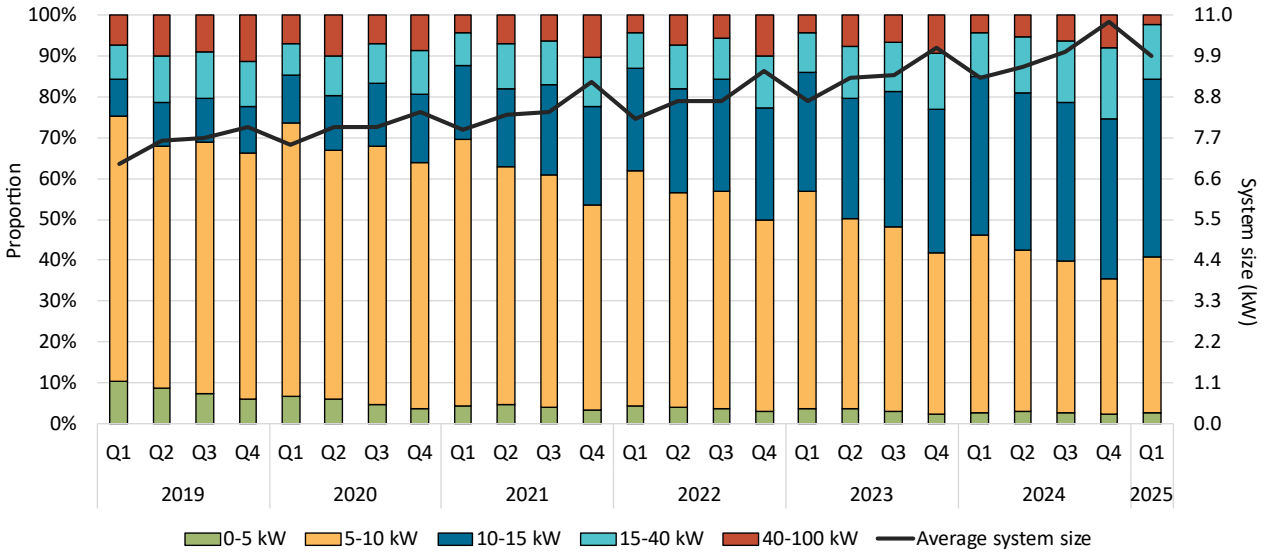


Average system sizes continue to increase

In the past year, the average system size for residential solar installations has grown from 9.3 kW in Q1 2024 to 9.9 kW in Q1 2025. This increase is driven by growth in the number of large residential and commercial installations within the 10-15 kW and 15-40 kW ranges, respectively. Installed capacity remains on track to fall within our projection of 2.9 GW to 3.2 GW.

The Cheaper Home Batteries Program may have an added impact on average system size, as generating extra energy to store and use later can improve the return on investment for larger systems.

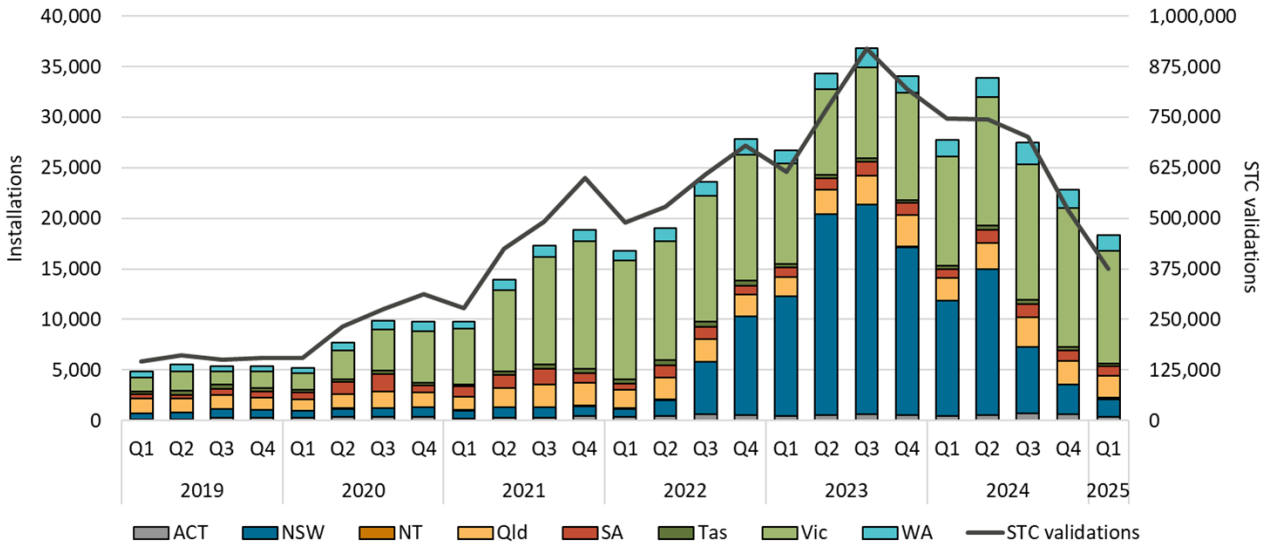
Figure 3.4 Small-scale rooftop solar capacity installed by system size band and average small-scale system size in kilowatts (kW)



Weaker demand for air source heat pumps continues

Data as of 31 March showed that around 18,300 air source heat pumps (ASHPs) were installed Q1 2025. When compared to Q1 2024, installations are down 34% from around 27,800. This decline is wholly attributed to a sharp reduction in NSW installation rates. NSW ASHP installations have fallen to around 1,800, compared to almost 11,500 in Q1 2024. This shift has been attributed to tightening of eligibility requirements for the Household Energy Saving Upgrades scheme as discussed in previous QCMRs.

Figure 3.5: Air source heat pump installations by state and territory and associated small-scale technology certificate (STC) validations



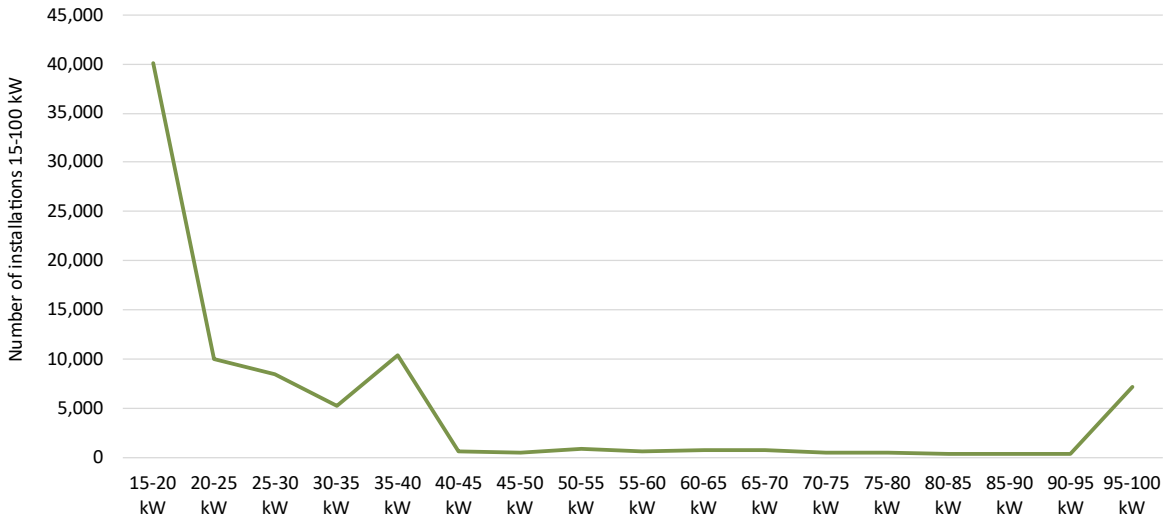
Small commercial solar in the SRES: trends and opportunities

Solar PV systems between 15 kW and under 100 kW are considered 'small commercial'. While more than 4 million solar PV systems have been installed under the SRES, the overwhelming majority have occurred in the residential sector (15 kW or below). Data from 2024 shows that just 7% of installations and 20% of capacity were in the small commercial range.

Small commercial systems are installed by businesses as well as other entities such as public schools or hospitals. The payback period for commercial systems is typically in the 2-5 year range, making the investment potentially attractive for many entities. As most businesses operate during the day, installing storage is less likely to be cost effective without the emergence of attractive offers to export excess daytime generation for other consumers to use after business hours.

While small commercial PV can be financially attractive, other barriers may contribute to relatively low take-up. The Clean Energy Council identified business ownership as a key barrier, as businesses leasing their properties must negotiate with their landlords. Commercial sites are more complex than residential, requiring licensed EPC (engineering, procurement, and construction) installers to manage larger projects, and meet specific regulatory and compliance requirements for commercial installations including approvals from distribution network service providers.

Figure 3.6. Small-scale commercial system size distribution in kilowatts (kW), 2020 to 2024



CER data from 2020 to 2024 show that commercial systems 20 kW, 40 kW and 100 kW are the most likely system sizes to be installed. 20 kW systems typically meet the energy needs of the average small commercial buyer.

The small peak in installation around 35 to 40 kW systems is because these systems were previously at the capacity limit that could be installed without electrical safety requirements that require a grid protection unit to minimise the impacts of fluctuations in voltage, frequency and other parameters on the electrical grid. This extra piece of hardware typically costs an additional $5,000, making this system size range less financially attractive. As a result, historical installations fall sharply after 40 kW. In August 2024, changes to electrical safety standards and guidelines lifted system threshold for a grid protection unit to 200 kW. As such, this barrier to installations above 35 to 40 kW has been removed.

As systems larger than 100 kW must be accredited as renewable energy generators under the Large-scale Renewable Energy Target scheme rather than receiving a rebate via STCs under the SRES, the clustering just under 100 kW is likely influenced by policy as well as economics.

Overall, if barriers can be reduced while maintaining appropriate power system security, the small commercial segment represents an opportunity for businesses to save on energy bills while contributing to reducing Australia's emissions.