Australian Government
Clean Energy Regulator

CLEAN ENERGY REGULATOR

Quarterly Carbon Market Report

December Quarter 2020

Australian Government
Clean Energy Regulator

OFFICE OF THE CHAIR

The Hon Angus Taylor MP
Minister for Energy and Emissions Reduction
Parliament House
Canberra ACT 2600

Dear Minister

I am pleased to submit the *December 2020 Quarterly Carbon Market Report* as the 2020 administrative report for the operation of the *Renewable Energy (Electricity) Act 2000*. The *December 2020 Quarterly Carbon Market Report* includes key information and metrics covering the operation of the Act for both the large-scale and small-scale schemes, and investment in renewables over the course of the year.

I also enclose the final annual statement about progress towards the 2020 Large-scale Renewable Energy Target, affirming that the target of 33,000 gigawatt hours (GWh) has been met and will be exceeded in 2021.

In the 2015 calendar year during which the Large-scale Renewable Energy Target was amended to 33,000 GWh, eligible generation was only 15,200 GWh. The challenge to meet the 2020 target was significant, a 117% increase in annual generation over five years, with many commentators saying it could not be achieved.

Minister Hunt sought to keep Parliament and the market informed of progress to the 2020 target by asking the Clean Energy Regulator to provide an Annual Statement.

Achieving the 2020 renewable energy target has been an enormous feat by so many participants in the renewables industry and electricity sector, supported by Australian Renewable Energy Agency, the Clean Energy Finance Corporation and state and territory governments. The certainty successive Commonwealth Ministers gave to the 2020 target was critical for the Renewable Energy Target scheme architecture to work as designed.

Australia is deploying new renewable energy 10 times faster per capita than the global average at an average rate of 220 watts per person per year.[1] Renewable electricity reached 30% in the National Electricity Market in the first quarter of 2021 and, on current government emissions projections, is tracking towards 55% renewables by 2030.[2]

If present rates of installation continue, this level will be exceeded.

The report is submitted for presentation to the Parliament in accordance with section 105 of the *Renewable Energy (Electricity) Act 2000*. The final annual statement of progress to the 2020 target is submitted for the Parliament's information.

Yours sincerely

David Parker AM
Chair, Clean Energy Regulator

29 April 2021

[1] Blakers A, Baldwin K. and Stocks M. (17 March 2021) *Australia: 80% emissions reduction by 2040 Technical paper*. Australian National University, Energy Change Institute.
[2] Department of Industry, Science, Energy and Resources, *Australia's emissions projections 2020*, December 2020

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Report objective

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

This report consolidates information across the three national carbon markets that the Clean Energy Regulator administers for the December Quarter 2020 (October 2020 to December 2020) and providesinformation on supply and demand trends and opportunities to inform market decisions.

In accordance with section 105 of the *Renewable Energy (Electricity) Act 2000* this report covers the operations of the large-scale and small-scale schemes for the 2020 calendar year for presentation to Parliament.

Detailed information and metrics are available in the following sections:

- 2020 market outcomes and 2021 marketestimates
- Executive summary
- Chapter 2 Large-scale generation certificates
- Chapter 3 Small-scale technology certificates, and
- Chapter 4 Renewables investment in 2020.

Report disclaimer

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

This Quarterly Carbon Market report represents the views of the Clean Energy Regulator at the date of publication. The Clean Energy Regulator 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 Clean Energy Regulator administers. The Clean Energy Regulator has used its best endeavours to ensure the quality of the information in this document but cannot guarantee its accuracy or completeness. The Quarterly Carbon Market report is not legal, business or financial advice. You should obtain independent professional advice your particular circumstances markets before making any investment decisions. The information is provided as general information only. Neither the Clean Energy Regulator nor the Commonwealth of Australia will accept liability for any direct, incidental or consequential loss or damage resulting from the Quarterly Carbon Market report, or the information provided through Quarterly Carbon Market report, or the availability or non-availability of Quarterly Carbon Market report.

Version history

Version	Date	Changes
1.00	10 March 2021	

2020 MARKET OUTCOMES AND **2021** ESTIMATES

EMISSIONS REDUCTION FUND AND RENEWABLE ENERGY TARGET

MARKET OUTCOMES

	2020 RESULTS	TREND (FROM 2019)	2021 ESTIMATES	TREND (FROM 2020)
Total emissions reduction	53.3mt	11% ↑	57mt	↑
ACCUs issued	16m	8% ↑	17m	↑
Renewable capacity installed	7 GW	11% ↑	6+ GW	→
LRET	4 GW			
SRES	3 GW			

LEAD INDICATORS FOR 2021 PERFORMANCE

	2020 RESULTS	TREND (FROM 2019)
New ERF projects registered in 2020	158	300% ↑
Utility-scale projects achieving financial close in 2020	2.7GW	17% ↑
Rooftop solar PV capacity installed in 2020	3GW	40% ↑

VOLUNTARY AMBITION

	2020 RESULTS	TREND (FROM 2019)	TREND (FROM 2020)
Voluntary surrender - **DOMESTIC**	4.9m	400% ↑	↑
ACCU	0.8m		
LGC	4.1m		
Voluntary surrender - **INTERNATIONAL** (CERs)	5.8m	30% ↑	

*2021 estimates are preliminary estimates and are subject to change. Estimates will be updated throughout 2021.

Executive summary

Emissions reduction from the schemes administered by the Clean Energy Regulator increased to 53.3 million tonnes of carbon dioxide equivalent (CO_2-e) in 2020, up 11% on 2019. This is expected to grow to 56.9 million tonnes CO_2-e in 2021 (See Figure 1).

2020 was another record-breaking year with

- 7 gigawatts (GW) of new renewable energy capacity delivered across Australia, up 11% from the 6.3 GW in 2019, and
- 16 million Australian carbon credit units (ACCUs) issued, up 8% from 14.8 million in 2019.

Renewables investment accelerated in 2020

The record 7 GW of new renewable energy capacity in 2020 comprised:

- 4 GW of large-scale renewable energy capacity accredited under the Large-scale Renewable Energy Target (LRET), and
- 3 GW of rooftop solar PV installed under the Small-scale Renewable Energy Scheme (SRES).

This outcome exceeded the Clean Energy Regulator's original 2020 estimate of 6.3 GW; and was primarily driven by several utility-scale power stations commencing generation and being accredited sooner than expected.

The continued rapid growth in rooftop solar PV in the SRES, which increased 40% year on year to 3 GW, also contributed to this outcome. Sustained low technology costs together with increased work from home arrangements and a shift in household spending to home improvements during COVID-19 contributed to this growth.

Installation and capacity growth in Quarter 4 2020 and January 2021 point to a potential material increase in added rooftop solar PV capacity again in 2021. The Clean Energy Regulator expects between 3 and 4 GW[3] of rooftop solar PV to be installed in 2021 and will make a firm estimate in the March Quarter 2021 Quarterly Carbon Market Report.

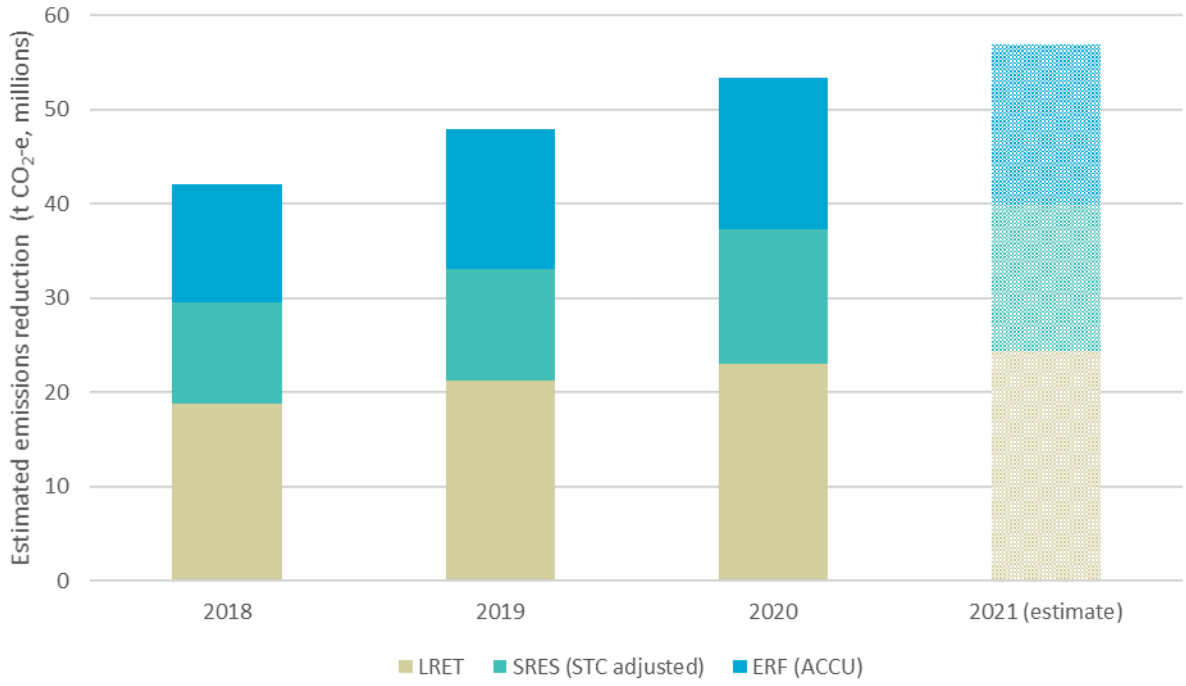
2020 saw a switch in the mix of utility scale capacity with wind accounting for a greater proportion of total capacity: 58% of accredited capacity in 2020, compared to 37% of accredited capacity in 2019. This change was primarily driven by the accreditation of Stockyard Hill, Dundonnell and Moorabool wind farms. However, in 2021 utility-scale renewables is expected to be dominated by solar.

As at the end of December 2020, Australia has installed 32 GW[4] of new renewable capacity – 19 GW of large-scale renewable energy capacity under the LRET and 13 GW of rooftop solar under the SRES.

[3] This should not be taken as guidance for the 2021 small-scale technology percentage, which is derived from modelling completed by consultants.

[4] This data does not include power stations with a baseline (8.1 GW) that were operating before the commencement of the Renewable Energy Target in 2001.

Figure 1: Estimated emissions reduction (t CO_2-e, millions), 2018 to 2021[5]



Mid-scale solar capacity (100kw to 30MW) decreased 29% in 2020, on the back of difficult business conditions during COVID-19.

Between 2018 and 2020, Australia added 18.3 GW of new renewable capacity, averaging more than 6 GW each year over 3 years. Investment over this period was $26.5 billion, with $9.7 billion alone in 2020.

The Clean Energy Regulator expects this level of investment to continue with circa 6 GW of renewable capacity to be added in each of 2021 and 2022.

2.7 GW of financial close announcements were recorded in 2020 for utility-scale power stations, up 18% from 2.3 GW in 2019. The Clean Energy Regulator expects to see between 2 and 3 GW of new committed projects to be announced each year.

This level of renewables investment is reshaping Australia's electricity sector at a rapid pace. In Quarter 4 2020 total renewable generation in the National Electricity Market (NEM) reached 30.4%, up 4.8% from 25.6% at the end of 2019.[6]

Continued strong growth of rooftop solar PV, coupled with mild weather in Quarter 4 2020, reduced operational demand across the NEM by 3% compared to Quarter 4 2019 levels. Reduced operational demand and record high wind and solar output significantly displaced thermal generation in the quarter, down 7% compared to Quarter 4 2019 levels.[7]

Forecasts by Department of Industry, Science, Energy and Resources (DISER) suggest renewable energy will account for 42% of electricity across all of Australia by 2025.[8] The average NEM grid emissions intensity factor also fell to an estimated 0.71 in 2020, the lowest level on record. In Quarter 4 2020 the emissions intensity of the NEM fell to 0.7 tonnes CO_2-e per

[5] Estimated emissions reduction from the LRET in 2021 includes 2.6 million tonnes of CO_2-e corresponding to 4,000 GWh generation expected from voluntary demand for LGCs.

[6] Renewables penetration includes estimated rooftop solar and all other sources of renewable energy for Quarter 4 in the NEM. Data sourced from AEMO and OpenNEM.

[7] AEMO, Quarterly Energy Dynamics Report Q4 2020, January 2021.

[8] DISER's forecasts utilise the Clean Energy Regulator's data. The renewables outlook has continued to improve since the Clean Energy Regulator last provided DISER data.

megawatt hour (MWh)[9]; hence, the average for 2021 is expected to be well below 0.7.

The Large-Scale Renewable Energy Target has been met

At the end of January 2021, the Large-scale Renewable Energy Target of 33,000 gigawatt hours (GWh) was met on a rolling 12-month basis.

In the 2020 calendar year, eligible large-scale renewable generation[10] fell slightly short at an estimated[11] 32,300 GWh. This was just outside the Clean Energy Regulator's expected range of 32,500 GWh and 33,500 GWh. This was in part due to lower than average[12] eligible hydroelectric generation.

As discussed in the September Quarter 2020 Quarterly Carbon Market Report the Clean Energy Regulator revised down its 2020 generation estimate owing to some very material downside impacts, including slower connection and ramping of new power stations, higher levels of economic curtailment[13] in part due to lower daytime demand from record levels of rooftop solar.

Given this context, the 2020 outcome (up 4,300 GWh year on year) is a very strong result.

In the 2021 calendar year, the Clean Energy Regulator expects total eligible generation to be at least 37,000 GWh with the potential to reach 40,000 GWh. Updates on this will be provided throughout the year.

2021 will mark the first year that large-scale generation certificate (LGC) supply from large-scale renewables will exceed legislative demand and will set a record in that respect.

This does not necessarily mean that a large surplus of LGCs will emerge, given accelerating voluntary demand for LGCs to reduce scope 2 electricity emissions plus demand to redeem shortfall charge within the 3-year period. State and territory government and corporate surrender of LGCs grew substantially in 2020 to over 4 million LGCs, 12% on top of the legislated demand for 2020.

ACCU supply up in 2020 and growth expected for 2021

2020 saw ACCU supply reach a record 16 million owing to a 25% increase in savanna burning crediting and 17% increase in vegetation crediting compared to 2019. This is in line with the expected volume published in the December Quarter 2019 Quarterly Carbon Markets Report.

The 2020 supply of 16 million ACCUs is an 8% increase from the 2019 supply of 14.8 million ACCUs. Similar growth in ACCU issuances is expected in 2021, taking total supply to an estimated 17 million ACCUs for that year.

Quarter 4 2020 saw the highest quarterly registration (71 projects) since Quarter 3 2015 (128 projects). This took total project registration in 2020 to 158, four times as many registered in 2019 and the second highest annual registrations after 230 projects in 2015. These new projects represent a potential 50 million tonnes of emissions reductions over their lifetime. New supply from these projects is expected to be seen from late 2021 onwards as typically projects take 18-24 months from registration to first crediting.

The optional delivery contract, in conjunction with increasing demand from businesses and market expectations of increased emissions reduction ambition for Australia, continue to be drivers of new project registrations.

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[9] AEMO, Quarterly Energy Dynamics Report Q4 2020, January 2021.

[10] Excluding waste coal mine gas.

[11] This figure remains an estimate as it is based on a combination of actual verified eligible generation data available to the Clean Energy Regulator and estimated eligible generation based on NEMReview data and pending electricity generation returns (EGR). EGRs are used to confirm eligible generation for accredited power stations.

[12] Total estimated Renewable Energy Target eligible hydro generation for 2020 was 1,200 GWh, lower than an average year of 1,400 GWh

[13] Economic curtailment is when generators opt to shut down due to negative wholesale electricity prices.

Voluntary markets

Demand for ACCUs and LGCs for voluntary private and state and territory government markets reached record levels in 2020. A total of 4.9 million ACCUs and LGCs were surrendered in 2020, a four-fold increase compared to 2019.

For Quarter 4 2020, this demand hit a new quarterly record with 304,000 ACCUs, up 4% on the previous record in Quarter 2 2018. This brought total ACCU cancellations to 841,000 in 2020, a 76% increase on the 476,900 ACCUs cancelled in 2019. Climate Active participant surrenders were the primary contributor to this increase accounting for 64% of the demand growth.

Over 156,000 LGCs were voluntarily surrendered in Quarter 4 2020, up 84% compared to the same period in 2019. This increase was primarily driven by surrenders for renewable energy commitments by corporate entities.

International unit voluntary surrenders are still more material than ACCUs or LGCs with 1.5 million Certified Emissions Reduction (CERs) units surrendered in Quarter 4, and the total for the year of 5.8 million[14], up 30% from the 4.4 million surrendered in 2019.

Unit and certificate prices

The ACCU spot price increased from $16.10 at the end of Quarter 3 2020 to $16.55 at the close of Quarter 4 2020 (see Table 1).

Small-scale technology certificate (STCs) spot prices were $38.00 at the close of Quarter 4 2020. This was a decline of $0.50 compared to the Quarter 3 closing price of $38.50.

The LGC spot price experienced a 5% decrease from $42.50 at end of Quarter 3 2020 to $40.00 at end of Quarter 4 2020.

Table 1: Price trend, Quarter 4 2020

Certificate type	Spot price AUD (31 December 2020)[15]	Quarterly trend
ACCU	$16.55	+$0.45
LGC	$40.00	-$2.50
STC	$38.00	-$0.50

Looking forward

In late 2019 and 2020, several new initiatives to transition Australia to low emissions technologies and unlock pathways to lower cost abatement were introduced or progressed by the Australian Government. These include the:

- Expert Panel (King) review provided advice on how to unlock low cost abatement opportunities from across the economy, including mechanisms to increase the supply of ACCUs and encourage participation in carbon markets,
- National Hydrogen Strategy that provides a framework for Australian governments and industry to work together to build Australia's hydrogen industry, and
- Technology Investment Roadmap that focuses investment in priority low emissions technologies: clean hydrogen, energy storage, low carbon materials, carbon capture and storage and soil carbon

Collectively these initiatives aim to create a step change to reduce Australia's emissions over the medium term and act as a catalyst for private sector investment.

The Clean Energy Regulator is also consulting on the design of a new Corporate Emissions Reduction Transparency (CERT) report that will help National Greenhouse and Energy Reporting (NGER) scheme reporters show how they are meeting their voluntary emissions reductions goals.

[14] Data is based on cancellation of CERs in ANREU only.

[15] Data sourced from Jarden and TFS Green.

1. Australian carbon credit units

- 2020 saw a record 16 million ACCUs issued, surpassing the previous high of 14.8 million ACCUs in 2019. Supply is expected to increase again to over 17 million in 2021.
- In Quarter 4 2020, 71 projects were registered taking total registered projects for 2020 to 158. This is four times as many projects registered in 2019, and the second highest annual registration since 2015 with 230 projects.
    - Soil carbon project registrations rose strongly with 43 projects in Quarter 4 and a total of 64 projects registered in 2020.
- ACCU spot prices increased from $16.15 at the end of Quarter 3 to $16.55 at the end of Quarter 4 2020, before reaching $16.90 at the end of January 2021.
- Voluntary cancellations reached a record high of 841,000 ACCUs in 2020 up from 477,000 in 2019. Voluntary cancellations are expected to grow to over 1 million ACCUs in 2021 in response to accelerating corporate voluntary demand.
- The next ERF auction will be held on 12-13 April 2021.

1.1. Supply and demand balance

Quarter 4 2020 saw ACCU supply increase by 5.2 million, while Emissions Reduction Fund (ERF) contract deliveries and voluntary surrender totalled 3.7 million ACCUs (see Figure 2).

This resulted in the balance of ACCUs held in the Australian National Registry of Emissions Units (ANREU) increasing by 1.5 million in the quarter to an all-time high of 7.9 million at the end of 2020 (see Table 2).[16]

Table 2: Balance of supply and demand at Quarter 4 2020 close[17]

Balance/supply of ACCUs from Quarter 3 2020	6,393,875
ACCUs issued Quarter 4 2020	5,188,539
Emissions Reduction Fund contract deliveries	-3,395,749
Safeguard surrender[18]	0
Voluntary surrender	-304,075
ACCU relinquishment[19]	0
Net balance at the end of Quarter 4 2020	7,882,590

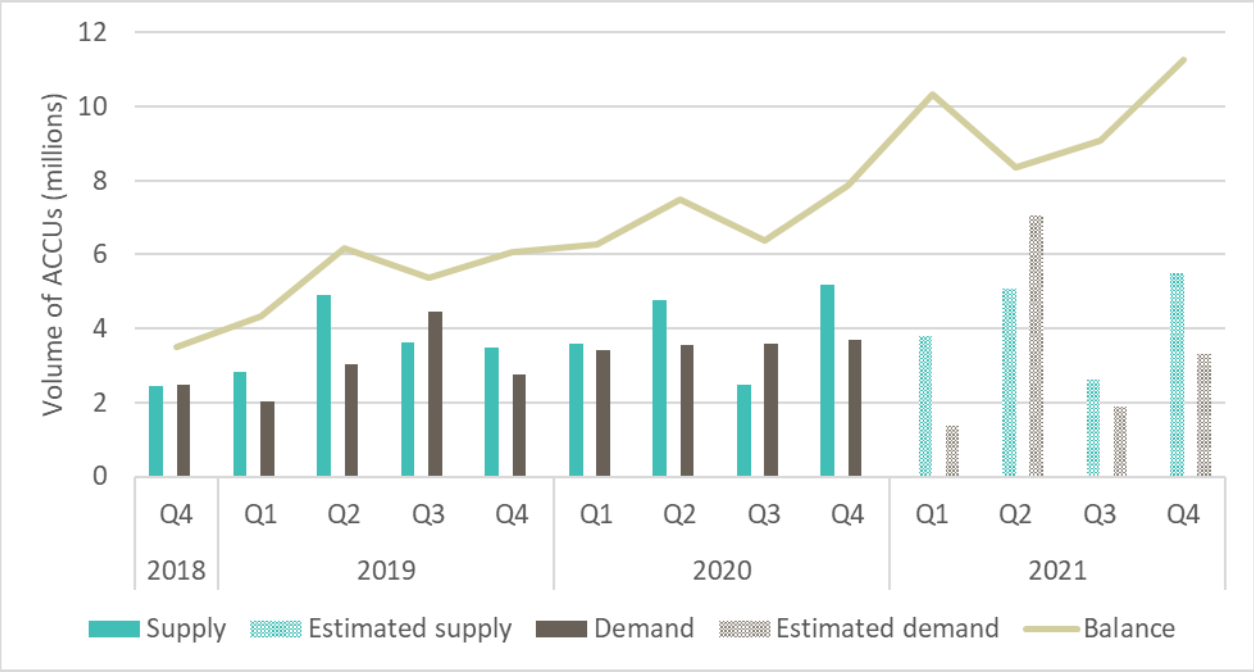
[16] The 7.9 million ACCUs available in ANREU accounts may not be available for sale as a portion of these ACCUs may be held or banked for future needs (e.g. for delivery under contract, future safeguard mechanism liability or voluntary cancellation).

[17] Within a specified period, supply of ACCUs refers to ACCUs issued. Demand of ACCUs incorporates three sources including Commonwealth ERF contract deliveries, Safeguard mechanism surrender and state and private sector voluntary cancellation.

[18] Safeguard mechanism surrender does not include deemed surrender. A 'deemed surrender' occurs when ACCUs issued under an ERF project at a Safeguard facility, in a particular year, are delivered to the Commonwealth under an ERF contract.

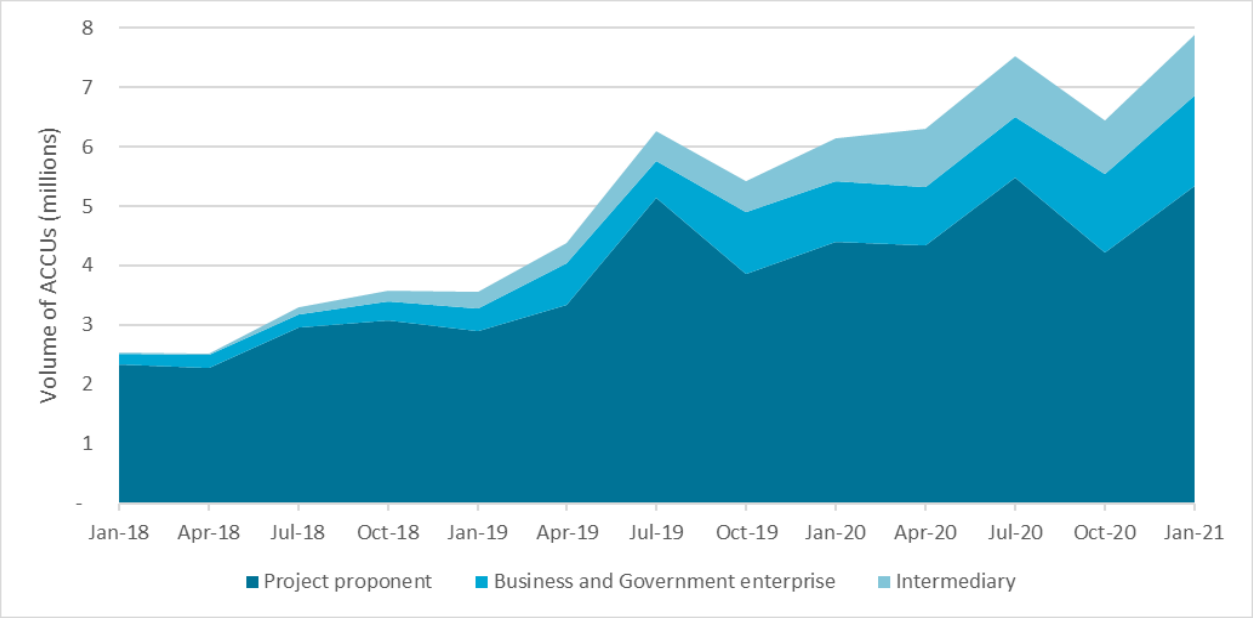
[19] For more information see ACCU relinquishments.

Figure 2: ACCU supply and demand balance (millions), Q4 2018 to Q4 2021



ACCUs held in ANREU accounts increased across all holder categories (see Figure 3).[20] Holdings by business and government enterprises reached a peak of 1.5 million ACCUs, likely accumulated to meet future safeguard and voluntary demand.

Figure 3: Breakdown of ACCU holdings by market participation (millions), Q1 2018 to Q4 2020



[20] For the definition of market participation groups, see the December Quarter 2020 Quarterly Carbon Market Report Workbook.

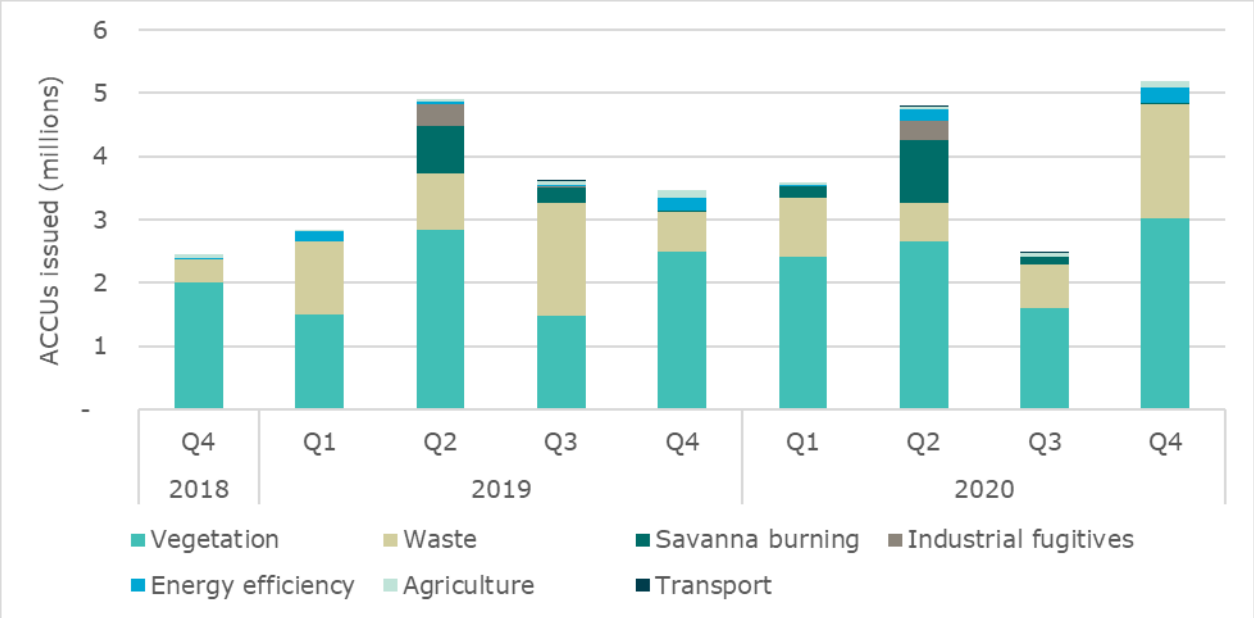
1.2. Factors impacting supply

Crediting

Quarter 4 2020 saw the highest issuance in a quarter with 5.2 million ACCUs. Vegetation projects continued to dominate, representing 58% of the ACCU supply, followed by waste projects with 35% of the supply in Quarter 4 2020 (see Figure 4).

Supply in 2020 reached a record 16 million ACCUs, in line with the expected volume published in the December 2019 Quarterly Carbon Market Report. An increase in ACCUs of 17% for vegetation and 25% for savanna burning projects in 2020 compared to 2019 were the key factors. A similar growth trajectory is expected in 2021 leading to supply of an estimated 17 million ACCUs.

Figure 4: ACCUs issued per method type (millions), Q4 2018 to Q4 2020



13 projects were credited for the first time in Quarter 4 2020, contributing 313,000 ACCUs to supply, most of which came from Human-Induced Regeneration projects. A total of 38 projects were credited for the first time in 2020 (see Figure 5). This figure reflects the lower levels of project registrations in 2018 and 2019.

Following the surge in project registrations in 2020, this trend is expected to reverse in 2021, notwithstanding the time it takes to establish a project and start earning credits. There are 416 projects registered but yet to receive credits, including 107 projects registered without any conditions attached (see Table 3).[21]

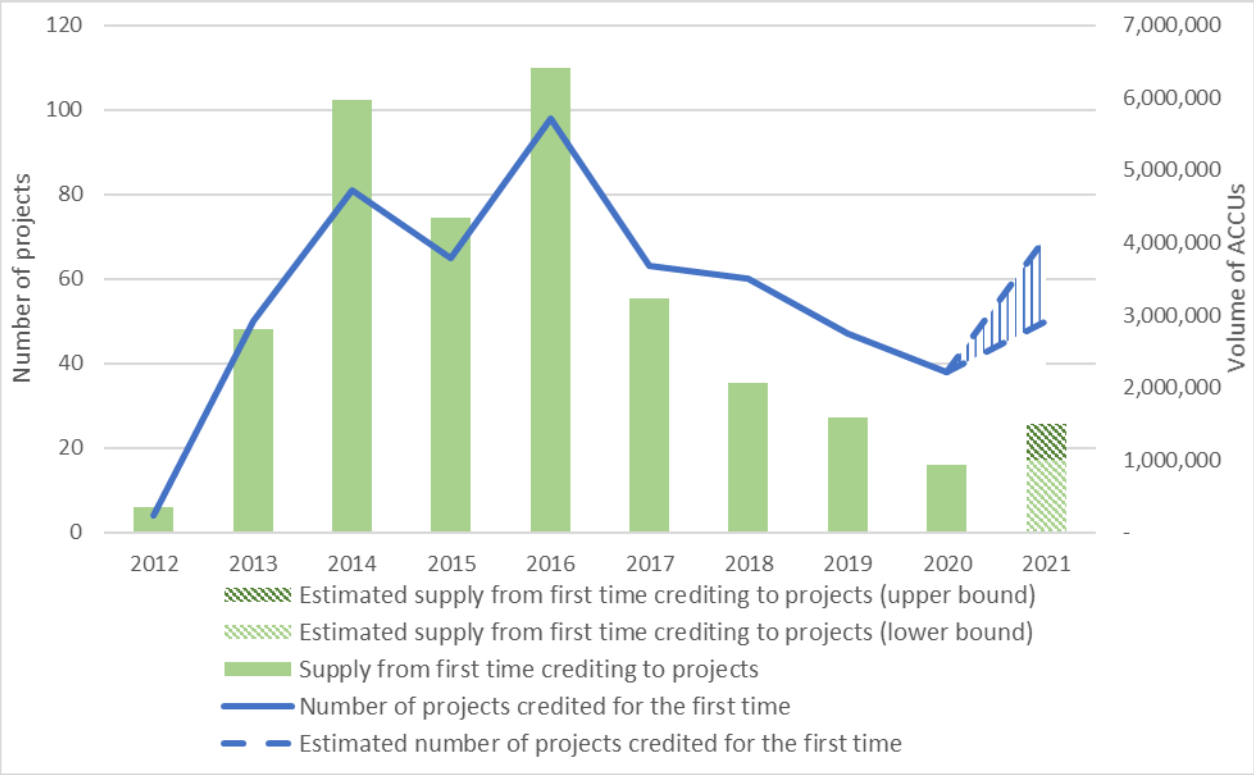
Table 3: Crediting status of projects

Crediting status	No. of projects
Projects generating ACCUs	506
Projects yet to receive ACCUs[22]	416
Conditionally registered	309
Unconditionally registered	107

[21] For many projects to be issued credits they are first required to meet certain project conditions (e.g. eligible interest holder consents). Projects are also required to submit a report to receive credits within certain time periods depending on the method. If projects do not meet their conditions or report within their allotted time periods, then these projects may not proceed and may be revoked.

[22] Projects generally take one to two years from when they are registered before they are issued their first ACCUs. Once projects are registered, they have a crediting period between 7 to 25 years depending on the method.

Figure 5: Number of projects credited for the first time and associated supply from first time crediting, 2012 to 2021



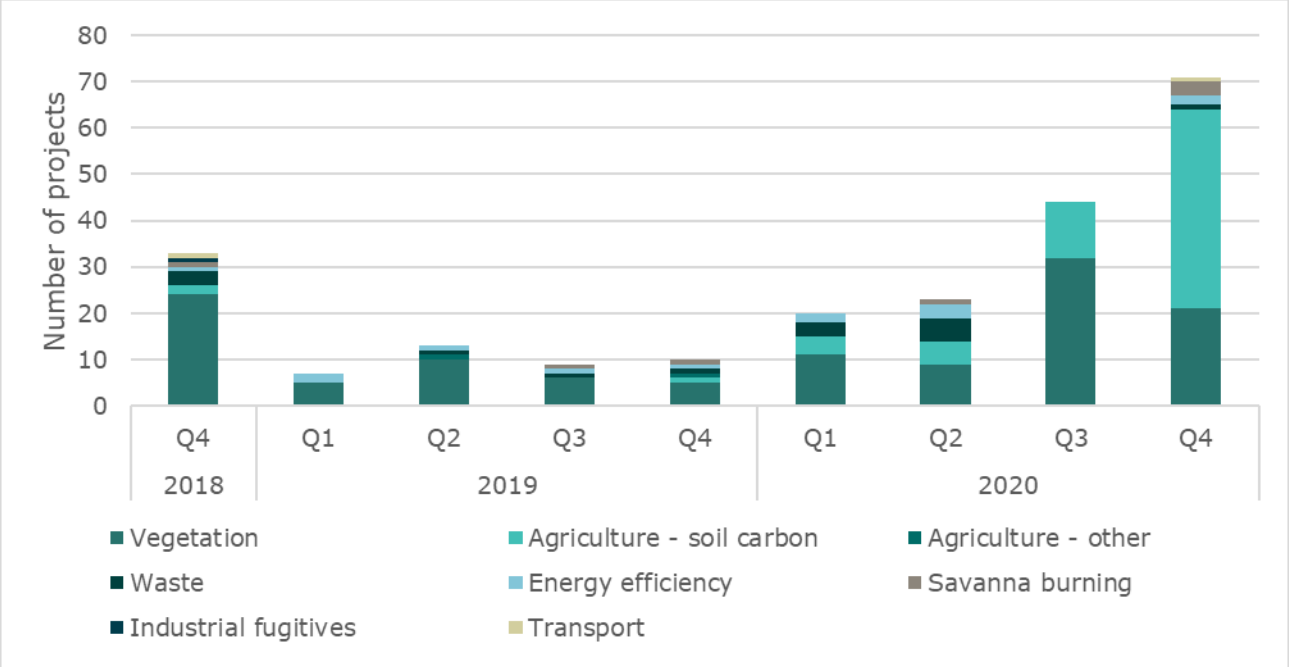
Projects

Quarter 4 2020 saw the highest quarterly registration (71 projects) since Quarter 3 2015 (128 projects; see Figure 6).

Projects registered in 2020 totalled 158, four times as many as registered in 2019, and the second highest since 230 projects were registered in 2015.

The 158 projects registered in 2020 are estimated to deliver up to 50 million tonnes of abatement over their lifetime, compared with 9 million tonnes estimated from the 39 projects registered in 2019.

Figure 6: New registered projects per method type, Q4 2018 to Q4 2020



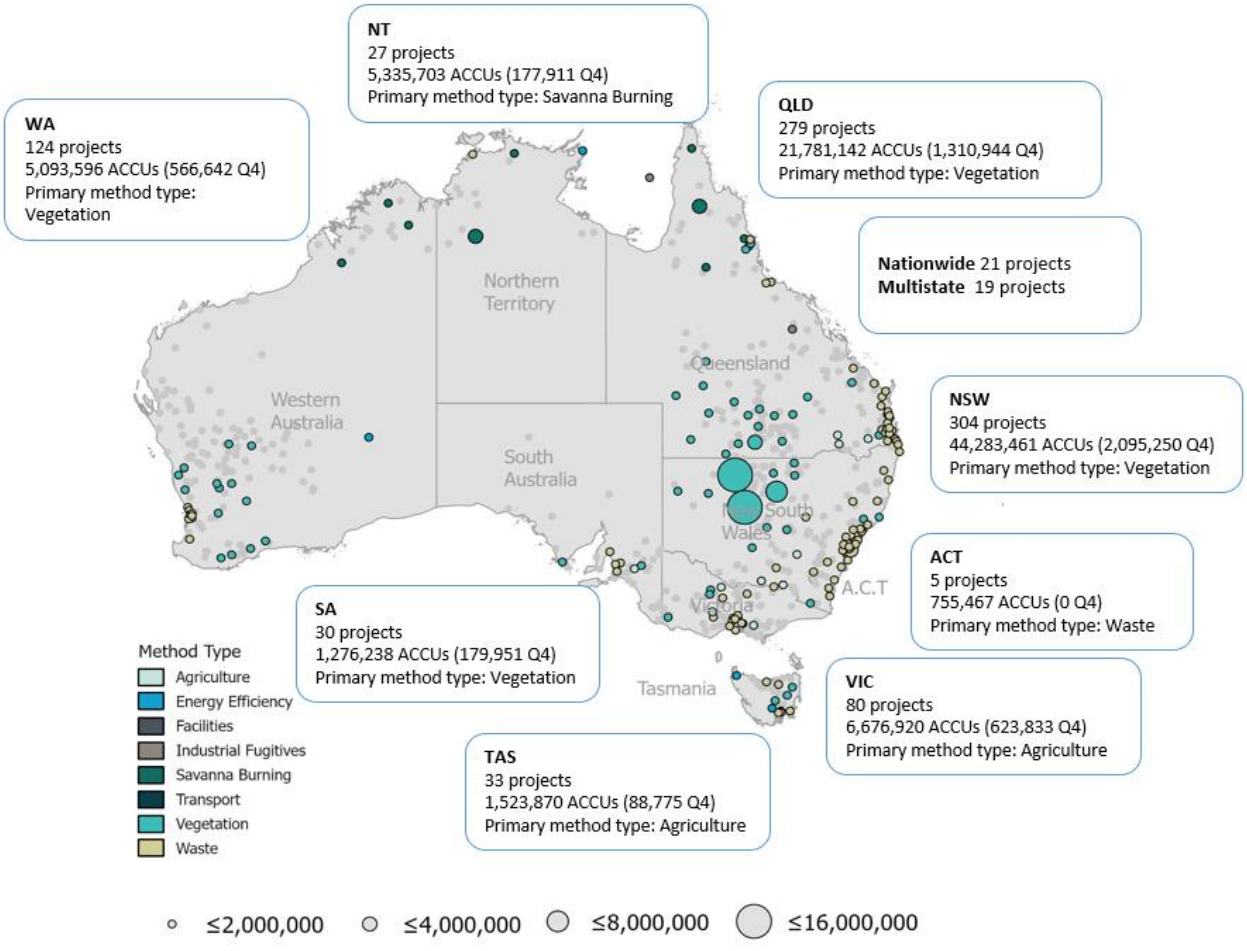
The increased rate of project registration observed in 2020 is expected to continue in early 2021 with new projects expected to be brought forward in the lead up to the next ERF auction on 12–13 April. 50 project applications, including 22 for soil carbon projects, were under assessment at the end of Quarter 4 2020.

Quarter 4 2020 saw the first tranche of successful projects announced under the Queensland government's Land Restoration Fund, with Queensland government committing $93 million for 19 carbon abatement projects. While potential abatement from these projects is not yet disclosed, they will deliver additional environmental, social, and economic co-benefits to Queensland.

Also during the quarter, the Western Australian government announced the Carbon Farming and Land Restoration Program. The Western Australia government has allocated $15 million to this program, which will include utilising the ERF framework and incentivising project development within Western Australia's south - west agricultural zone. These new sources of demand will be included in Clean Energy Regulator's estimates when more detail becomes available.

At the close of 2020, New South Wales accounted for the most projects registered within a state (304), while Tasmania had the biggest growth in their portfolio in 2020 with number of registered projects nearly doubling from 17 in 2019 to 33 in 2020. A snapshot of the ERF project portfolio across Australia at the end of Quarter 4 2020 is shown in Figure 7.

Figure 7: Total number of ACCUs issued per method type by location, Q4 2020 and scheme to-date



Method development

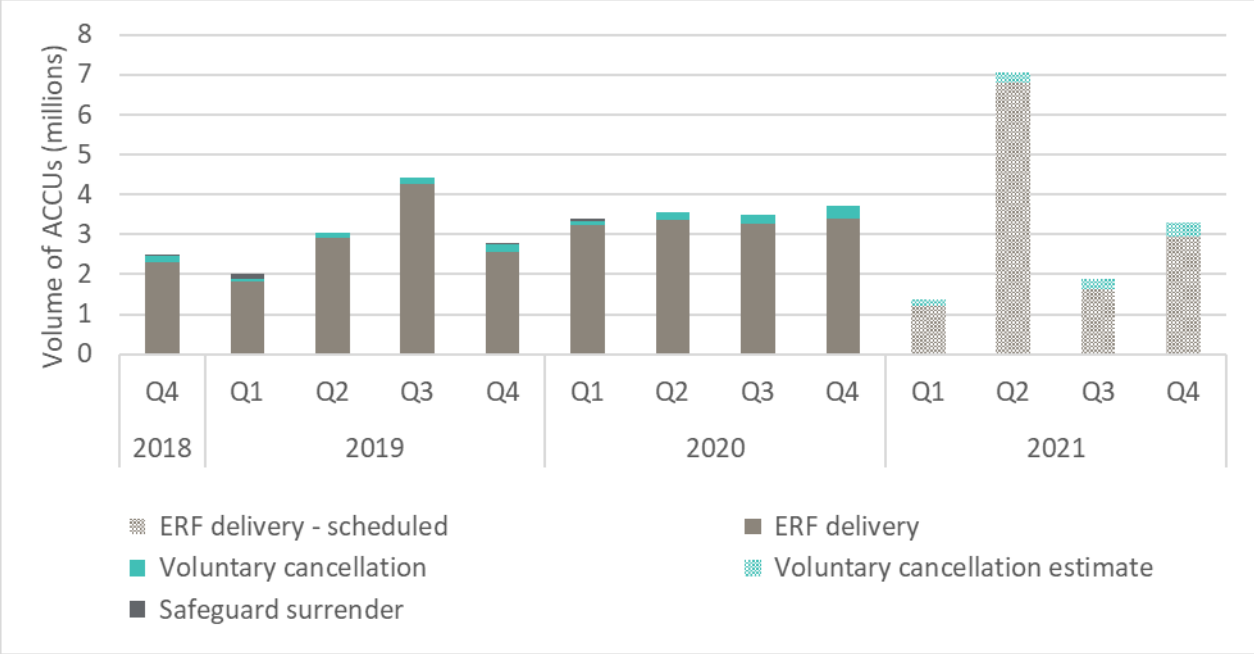
The Minister for Energy and Emissions Reduction has set priorities for the development of new ERF methods; these are: soil carbon, carbon capture and storage, biomethane, plantation forestry and blue carbon.

Information on the progress of method development is accessible from the Clean Energy Regulator's Method Development Tracker.

1.3. Factors impacting demand

Total demand for ACCUs in Quarter 4 2020 was 3.7 million, 34% higher than the same quarter in 2019 (see Figure 8). While Commonwealth contracts remained the largest source of demand at 92%, the share of voluntary private and state and territory demand continued to increase from 6% in Quarter 3 to 8% in Quarter 4 2020.

Figure 8: Actual and estimated demand[23] for ACCUs (millions), Q4 2018 to Q4 2021



Commonwealth demand

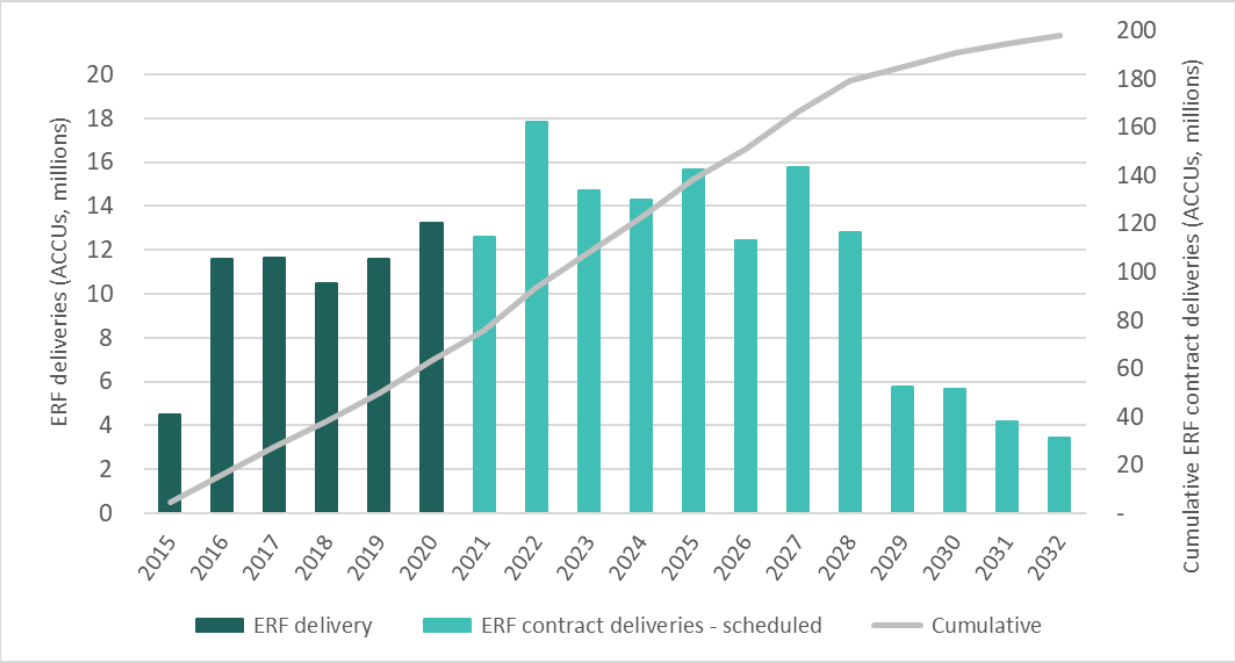
In 2020, a record 13.2 million ACCUs were delivered under contract to the Commonwealth, up 14% from the 2019 volume of 11.6 million ACCUs. This includes early delivery[24] of 2.5 million ACCUs in Quarter 4 2020 that were brought forward from 2021.

As such, the outstanding scheduled demand for 2021 has moderated to 12.6 million (see Figure 9). However, early deliveries could bring forward demand into 2021 from future years.

[23] Estimated demand is comprised of demand from scheduled delivery against Commonwealth contracts as at 31 December 2020 and estimated voluntary demand. Scheduled delivery against Commonwealth contracts include that for optional delivery contracts. ACCUs contracted against an optional delivery contract may not be delivered to the commonwealth.

[24] Of the 3.4 million delivered in Quarter 4 2020, 2.6 million were delivered against a milestone that was set beyond this quarter. The Commonwealth contract allows a degree of flexibility enabling delivery of ACCUs earlier than scheduled delivery milestones. While contract delivery schedules are determined at auction registration stage, variations to the delivery schedule can be negotiated with the Clean Energy Regulator in accordance with the Contract Code of Common Terms.

Figure 9: Commonwealth delivery for current portfolio of projects (volume of ACCUs, millions), 2015 to 2032



Voluntary surrender

Voluntary private and state and territory cancellations increased each quarter in 2020 reaching 304,000 ACCUs in Quarter 4 2020.

Voluntary cancellations in 2020 amounted to a record volume of 841,000 ACCUs. With a growing number of private and state and territory entities choosing to offset their emissions, the increasing demand for ACCUs is expected to exceed one million in 2021.

More information on the voluntary carbon market is in Chapter 5.

ERF auctions

ERF Auction 12 will be held on 12–13 April 2021.

Increasing project registrations, the availability of fixed and optional Commonwealth contracts, advance payment to support soil method baseline sampling costs and accelerating corporate interest in ACCUs all suggest Auction 12 will attract a high level of interest.

Guidelines for Auction 12 are available from the Clean Energy Regulator website.

Safeguard mechanism surrender

Safeguard entities can use a range of options to ensure their net emissions are at or below their baselines by 28 February 2021, including surrendering ACCUs. A total of 4,488 ACCUs have been surrendered against the 2019–20 compliance year as at 31 January 2021.

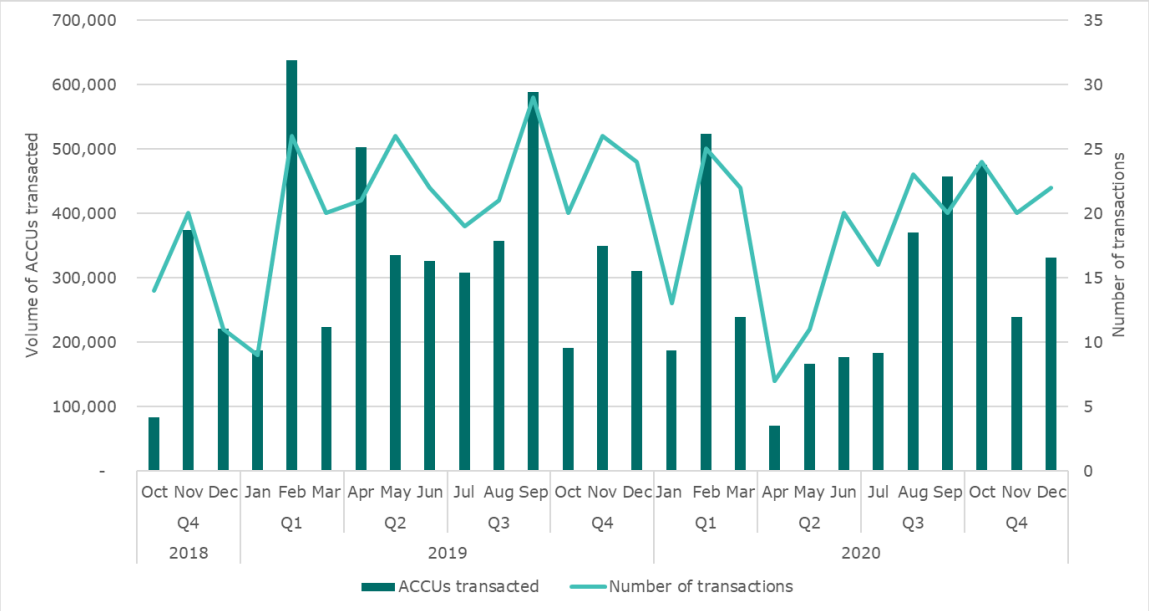
Overall ACCU demand for the 2019–20 compliance year is expected to be similar to previous compliance years.[25] With a total balance of 7.9 million ACCUs currently held in ANREU accounts, there should be sufficient ACCUs to meet safeguard demand.

Market trading

Quarter 4 2020 saw quarterly transaction number and volume reaching the highest in the year with 66 transactions accounting for over one million ACCUs (see Figure 10). On average 285,000 ACCUs were traded each quarter in 2020, down 21% on the volumes in 2019. The reduced level of market activity in 2020 was primarily due to the pandemic which impacted the market earlier in the year.

[25] A total of 58,731 ACCUs were surrendered for the 2018-19 compliance year.

Figure 10: ACCU market transactions (excluding ERF transactions)[26], Q4 2018 to Q4 2020



Spot price

The ACCU spot price increased from $16.10 at the end of Quarter 3 to $16.55 at the end of Quarter 4 2020 (see Figure 11). This trend continued in early 2021 reaching $16.90 at the end of January 2021. This is likely due to safeguard entities buying to meet their surrender obligations for the 2020-21 reporting period.

Figure 11: ACCU spot prices ($AUD), Quarter 4 2020

[26] ACCU market transactions refer to the transfer of ACCUs between separate entities or groups and does not include issuances and surrenders of ACCUs. Transactions involving the transfer of ACCUs between project proponents, between project proponents and project developers, and between accounts belonging to the same company and/or subsidiaries are excluded.

1.4. Key dates

Date	Event	Significance
28 February 2021	Safeguard compliance ACCU surrender deadline.	Deadline for safeguard entities to surrender ACCUs under the Safeguard Mechanism to avoid excess emissions situation.
12-13 April 2021	ERF Auction 12	The auction guidelines and details about the auction process is available on Participating in an auction webpage on the Clean energy Regulator website.

2. Large-scale generation certificates

- 4 GW of new large-scale renewable energy capacity was accredited in 2020, on par with 2019.
    - 1 GW of new large-scale renewable energy projects were accredited in Q4 2020.
- 605 MW of new projects reached financial close during the quarter, leading to a total of 2.7 GW committed over 2020. Committed and probable projects are at their highest level, 6.7 GW, since August 2019.
- Across the year approximately 40.6 million LGCs were available in the REC Registry for statutory demand, shortfall charge refunds and voluntary demand. Statutory demand was set at 33.8 million LGCs for the 2020 assessment year.
- Whilst, on balance, there were sufficient LGCs to meet statutory demand, material paid shortfall (6.3 million LGCs) was taken for the 2020 assessment year as liable entities seek to arbitrage lower LGC forward prices.
- The Large-scale Renewable Energy Target of 33,000 GWh was met at the end of January 2021.

2.1. Supply and demand balance

Over 2020 approximately 40.6 million LGCs were available for statutory demand, shortfall charge refunds and voluntary demand.

Total LGC supply was higher than anticipated[27] with 33.2 million LGCs available for 15 February 2021[28] surrender. This was mainly owing to high wind and solar output and power stations opting to create LGCs for partial December generation.

After the surrender deadline of 15 February 2021, 26.9 million LGCs were surrendered against liability for the 2020 assessment year, a compliance rate of 79.7%. This is up from the 2019 assessment year as less shortfall was taken, 6.8 million[29] LGCs compared to 7.7 million LGCs for 2019.

Additionally, some liable entities surrendered LGCs to claim a refund on shortfall charges paid for previous assessment years, just over 1 million LGCs were surrendered for refunds.

Voluntary demand reached 4 million LGCs in 2020, in line with expectations for the year set out in previous Quarterly Carbon Market Reports.

The total supply balance in the REC Registry after surrender was 9.2 million LGCs (see Table 4). Detailed results for the 2020 assessment year will be provided through the Clean Energy Regulator's annual publication of surrender results.

[27] In the September Quarter 2020 Quarterly Carbon Market Report the Clean Energy Regulator estimated an LGC supply of approximately 32 million LGCs.

[28] Surrender is typically on 14 February, where the 14th falls on a weekend surrender opens on the next business day.

[29] Of the 6.8 million LGCs taken as shortfall, 6.3 million LGCs related to paid shortfall and 550,000 was less than 10% carry forward.

LGC supply in 2021 is expected to increase to between 37 and 40 million LGCs. In contrast, legislated demand will remain static at 33 million LGCs from 2021 to 2030. Voluntary demand is expected to continue growing with an estimate of between 4.5 and 5.5 million LGCs in 2021 as corporate entities begin to take action to meet voluntary targets.

Table 4: LGC supply and demand balance (millions)

	Supply	Demand
LGC balance 14 February 2020	+7.4 million	
LGC supply (available for 2020 surrender)	+33.2 million	
LGCs surrendered 2020 assessment year		-26.9 million[30]
Shortfall charge refunds		-1.05 million
ACT Government scheme[31]		-2.3 million
GreenPower		-0.5 million
Other voluntary surrenders		-1.2 million
Total balance		**+9 million**

2.2. Factors impacting supply

LGC supply

LGC supply in Quarter 4 2020 was 11.5 million LGCs, 61% of this supply came from wind generation (see Figure 12). This is the largest quarter of supply for large-scale renewables.

An increase in LGC supply in Quarter 4 was expected due to the number of new power stations that began generating at full or close to full capacity in the year, favourable seasonal conditions for wind and solar which increased generation by 40% and 76% respectively over Quarter 3 2020 figures.

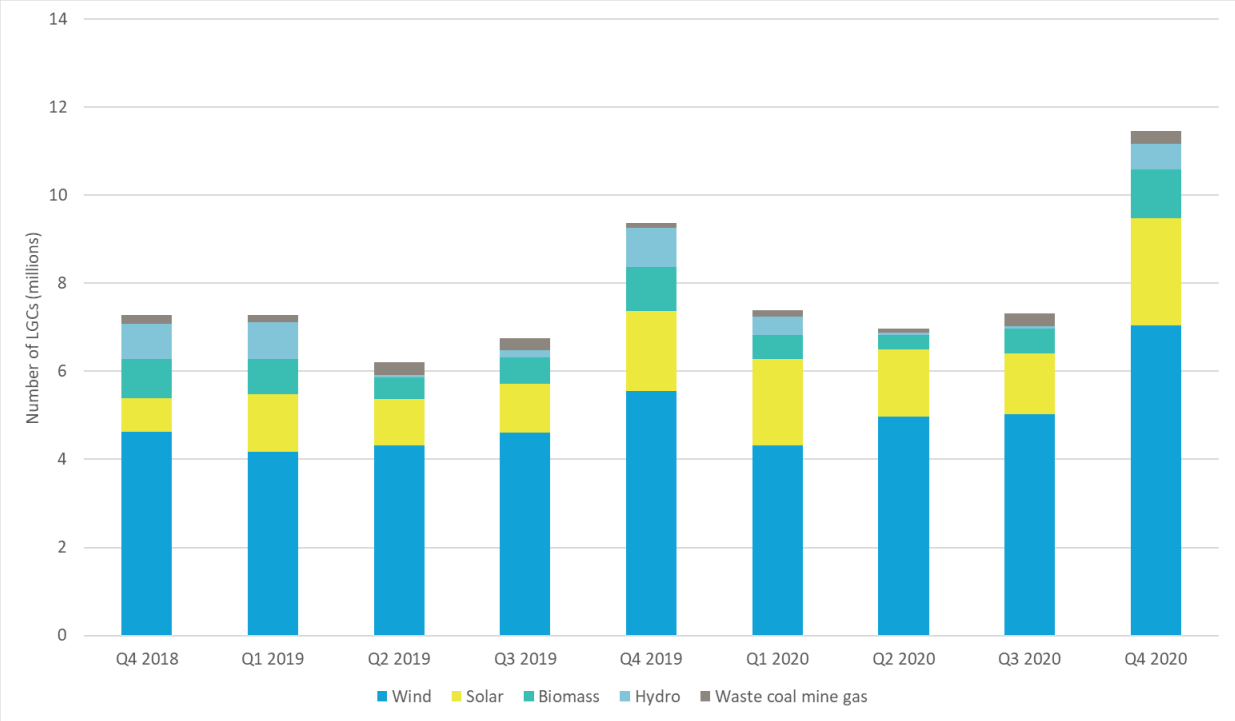
A pull forward in LGC creations for December generation also contributed to increased supply.[32]

Quarter 4 2020 was another record quarter for renewable energy generation, accounting for 30.4% of total NEM generation, up 4.8 percentage points compared to Quarter 4 2019.[33]

Increased voluntary activity and shortfall charge refunds reduced available LGC supply in 2020.

[30] Statutory demand for 2020 was 33.8 million LGCs, this figure reflects the amount of LGCs actually surrendered for the assessment year.
[31] This is the amount of LGCs surrenders by the Australian Capital Territory Government.
[32] Power stations can make partial claims for LGCs for December generation. This maximises the availability of eligible LGCs with the correct vintage for surrender.
[33] In Quarter 4 2019 renewable energy generation accounted for 25.6% of total NEM generation. This includes rooftop solar, utility-scale wind and solar, hydro and biomass.

Figure 12: LGCs validated by technology type (millions), Q4 2018 to Q4 2020



Accreditation

35 power stations were accredited in Quarter 4 2020, with a cumulative capacity of 952 MW (see Table 5). This takes total accredited capacity to over 4 GW[34] for 2020 (see Figure 13). Accredited capacity surpassed the estimated 3.4 GW, this is due to several utility-scale power stations that were expected to come online in 2021 commencing generation in 2020.

Collector Wind Farm (227 MW) and Wellington Solar Farm (200 MW) both in New South Wales were the largest power stations accredited in Quarter 4 2020.

The Clean Energy Regulator's estimate for 2021 is for the delivery of between 2 to 2.5 GW of large-scale capacity[35]. Expected accredited capacity for 2021 is lower than 2020 in part because two projects, Collector and Molong (39 MW), were accredited ahead of schedule in 2020.

Investment in utility-scale renewables remains solid. The Clean Energy Regulator continues to track a strong pipeline of projects that have either reached financial close or are subject to a power purchase agreement (PPA), see Committed and Probable projects section.

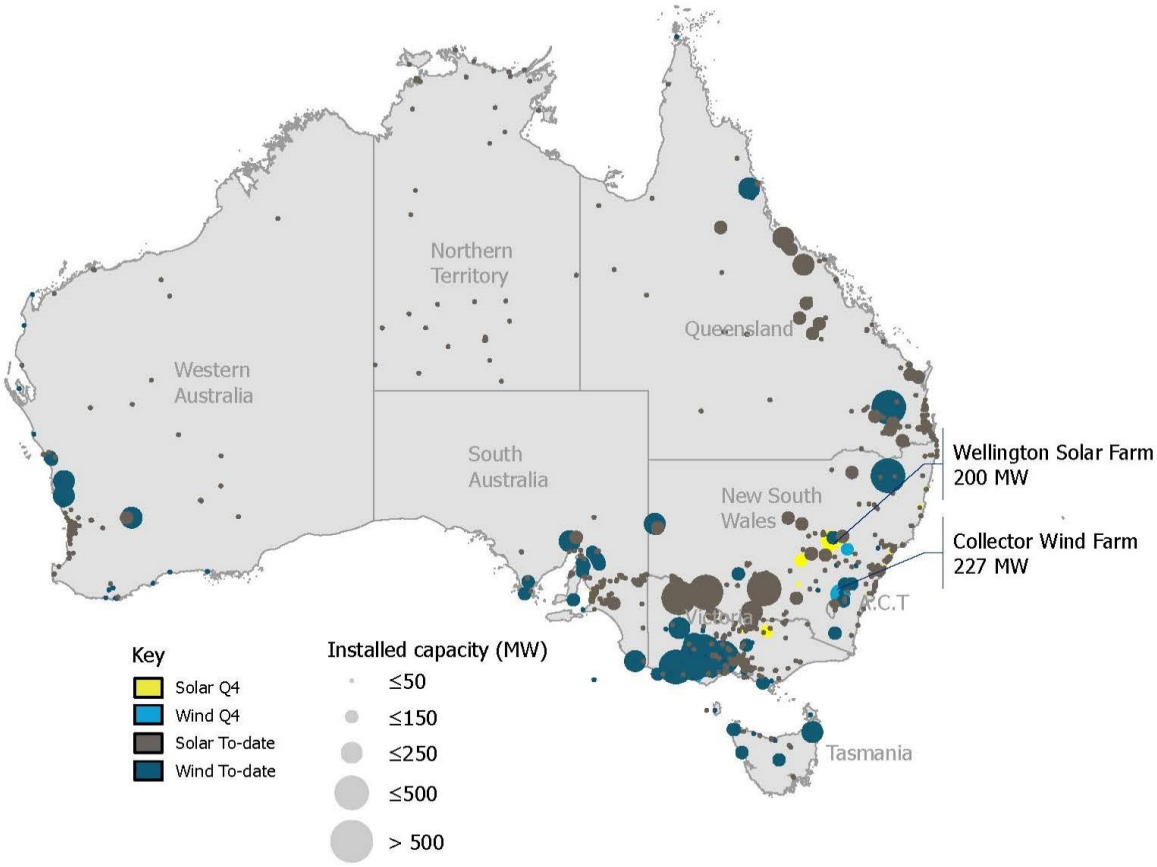
Table 5: Power station accreditation by state (MW), Quarter 4 2020

	Capacity (MW)
ACT	1.2
NSW	671
NT	0
QLD	2.3
SA	0.7
TAS	0
VIC	277
WA	0
Total	**952**

[34] This figure includes the Gangarri solar farm (144 MW) that is likely to be approved in 2021 with an accreditation start date in 2020.

[35] This includes mid-scale solar under the LRET.

Figure 13: Wind and solar power stations accredited capacity by location (MW), Q4 2020 and scheme to-date



Committed and probable projects

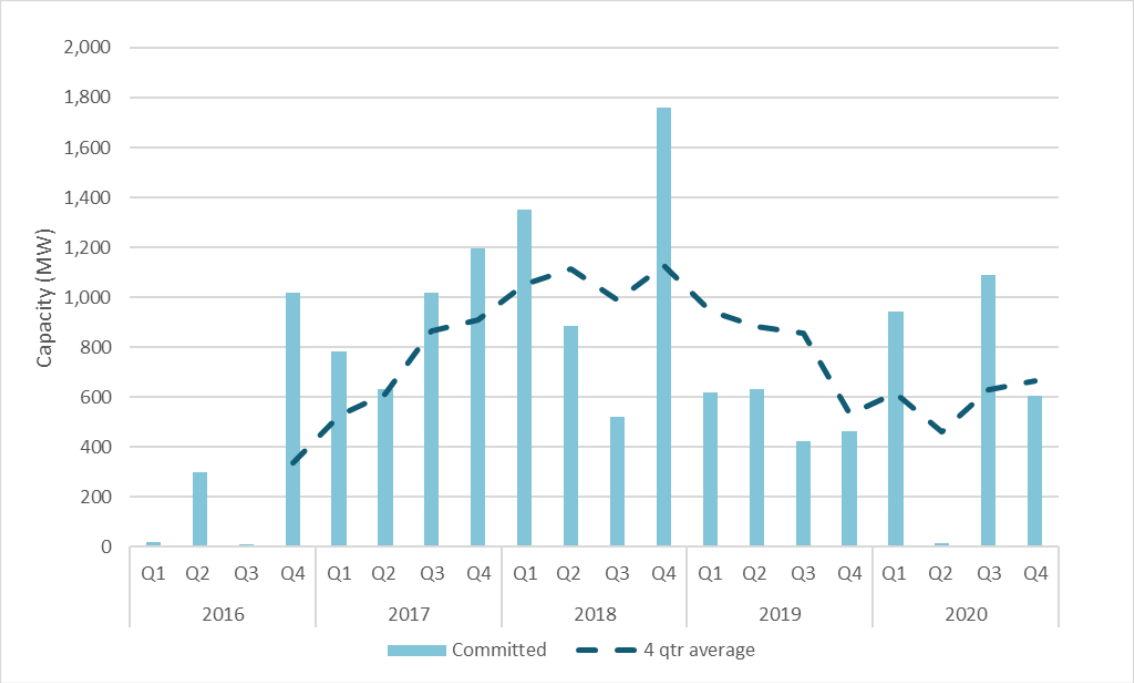
Quarter 4 2020 saw 605 MW of utility-scale wind and solar capacity reach financial close (see Figure 14). This brings the total committed capacity in 2020 to 2.7 GW - in the middle of the Clean Energy Regulator's expected range of 2 to 3 GW. [36]

The level of commitments has stabilised over the past 5 quarters at around 600 MW per quarter (on a four-quarter rolling average basis).

This is a strong result considering the uncertainty introduced to the global financial market through COVID-19, grid constraints generally and the emergence of issues such as curtailment (both economic and system strength) and MLF variations which has increased project risk in the NEM.

[36] For more information see the September 2020 Quarterly Carbon Market Report.

Figure 14: Capacity committed per quarter and 4 quarter moving average (MW), Q1 2016 to Q4 2020

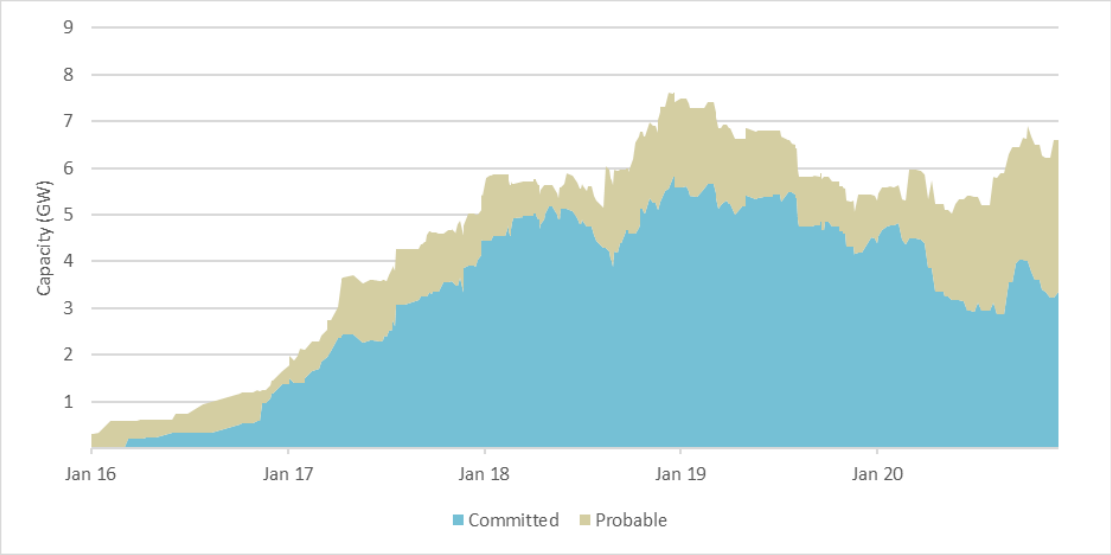


An additional 5 projects with a combined capacity of 1.1 GW signed PPAs in Quarter 4 2020 and were added as probable projects on the Clean Energy Regulator's pipeline[37].

This brought the total capacity of projects backed by a PPA to 3.2 GW[38] at the end of Quarter 4 2020 (see Figure 15).

Firmly announced projects (6.7 GW committed and probable)[39] are currently at their highest level since August 2019. The Clean Energy Regulator expects probable projects to reach financial close throughout 2021 and 2022.

Figure 15: Pipeline of committed and probable projects (GW), 2016 to 2020



[37] The Clean Energy Regulator considers a project to be committed when all development approvals have been received and a final investment decision has been reached. Probable projects are those that have a public announcement of a PPA with a strong counter party or other evidence of funding.

[38] This capacity reflects a project's total capacity, a PPA may only be underwritten for a portion of project's total capacity.

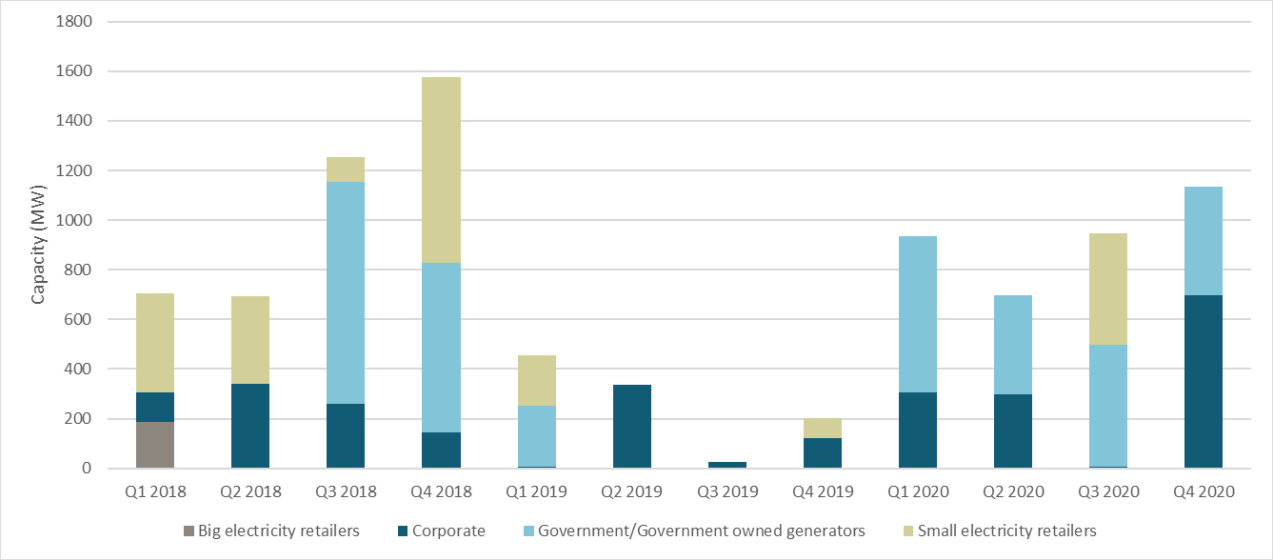
[39] This figure includes projects committed prior to 2020 that are currently under construction.

Growth in corporate PPAs

The growth in projects underpinned by PPAs or contracts to underwrite projects in 2020 was driven by state owned electricity generators and corporates (see Figure 16). Capacity contracted through corporate PPAs has been increasing and set a record 700 MW in Quarter 4 2020.

The Clean Energy Regulator tracks PPAs based on the first party to enter into a binding PPA or a contract to underwrite the project, enabling the project to progress to financial close. Often PPAs are signed for only partial capacity initially and subsequent PPAs for remaining capacity are signed once construction is underway or after completion.

Figure 16: PPA capacity contracted by quarter (MW), 2018 to 2020[40]



Government and government owned generators underpinned 1.5 GW of new renewable capacity in 2020 (see Figure 16). CleanCo (940 MW of PPA backed projects) and CS Energy (160 MW of PPA backed projects) were the main contributors in this sector.

Corporate PPAs continue to be a major driver for renewable investment in Australia, accounting for 1.3 GW of capacity in 2020.

Energetics' Corporate Renewable PPA Deal Tracker shows the total capacity contracted over 2020 is more than 4 GW. This is an additional 2.7 GW above the level estimated by the Clean Energy Regulator. The additional 2.7 GW is primarily attributable to PPAs signed for power stations after they have been financially committed or accredited.

Within corporate PPAs, the resources sector has been a strong driver of new projects over the past 12 months, underpinning 711 MW of capacity. In Quarter 4 2020, Newcrest, one of the world's largest gold mining companies, signed a 15 year PPA with the Rye Park Wind Farm for 40% of the electricity needs at their Cadia gold and copper mine.[41] The PPA is for 220 MW of the intended 400 MW project, and represents one of the largest standalone corporate PPAs to date.

The Clean Energy Regulator expects corporate PPAs support for renewable investment will continue to grow in significance in future years as large corporate entities both domestic and international seek to reduce emissions and reach their renewable or net zero carbon goals.

[40] The data in this graph is based on the capacity contracted through a PPA, where the PPA occurs before the project is committed and/or accredited. The government and government owned category include entities such as CleanCo, CS Energy and Snowy Hydro.
[41] Newcrest, Market release, 16 December 2020

The 2020 Large-scale Renewable Energy Target

At the end of January 2021, the Large-scale Renewable Energy Target of 33,000 GWh was met on a rolling 12-month basis. RET eligible generation from 1 February 2020 to 31 January 2021 reached an estimated 33,100 GWh.[42]

The Clean Energy Regulator has been tracking progress towards the 2020 target for several years, and announced there was sufficient capacity installed (6.4 GW of large-scale renewable energy capacity accredited between 2017 and 2019) to meet the target in September 2019.

In the 2020 calendar year, eligible large-scale renewable generation[43] fell slightly short of the target at an estimated 32,300 GWh. This was just outside the Clean Energy Regulator's expected range of 32,500 GWh and 33,500 GWh. In part this was due to lower than average[44] eligible hydroelectric generation which only became evident in Quarter 4 2020.

As per the September Quarter 2020 Quarterly Carbon Market Report the Clean Energy Regulator revised down its 2020 generation estimate owing to some material downside impacts, including slower connection and ramping of new power stations and higher levels of economic curtailment[45] in response to lower daytime demand from record levels of rooftop solar. Given this context, the 2020 outcome (up 4,300 GWh year on year) is a very strong result.

Looking forward

While the target has been achieved, it is by no means the end of renewable energy investment in Australia. The LRET continues to support investment to 2030 by providing certification of renewable electricity; power stations and LGCs will continue to be accredited and issued until the end of 2030.

In the 2021 calendar year, the Clean Energy Regulator expects total eligible generation to be at least 37,000 GWh with the potential to reach 40,000 GWh. The Clean Energy Regulator will provide updates on this throughout the year.

Generation growing beyond the target does not mean that a large surplus of LGCs will emerge given accelerating voluntary appetite for LGCs to reduce scope 2 electricity emissions and meet renewable energy commitments, see Chapter 5 for more information. In addition, there is additional demand to redeem shortfall charges within the allowable 3-year period.

[42] This generation estimate is calculated using data collected from power stations by the Clean Energy Regulator, supplemented with energy generated data for utility-scale power stations from NEMReview and generation estimates for mid-scale power stations.

[43] Excluding waste coal mine gas.

[44] Total estimated Renewable Energy Target eligible hydro generation for 2020 was 1,200 GWh, which was lower than an average year of 1,400 GWh.

[45] Economic curtailment is when generators opt to shut down due to negative wholesale electricity prices.

2.3. Factors affecting demand

Voluntary private and state and territory government demand

Quarter 4 2020 saw 156,000 LGCs voluntarily surrendered, an 84% increase on Quarter 4 2019 voluntary surrenders. These surrenders were primarily attributable to renewable energy commitments by state and private entities. In total, 4 million LGCs were voluntarily surrendered in 2020.

For a detailed breakdown of voluntary surrenders and the outlook for 2021, see Chapter 5 voluntary private and state and territory markets.

2.4. Market trading

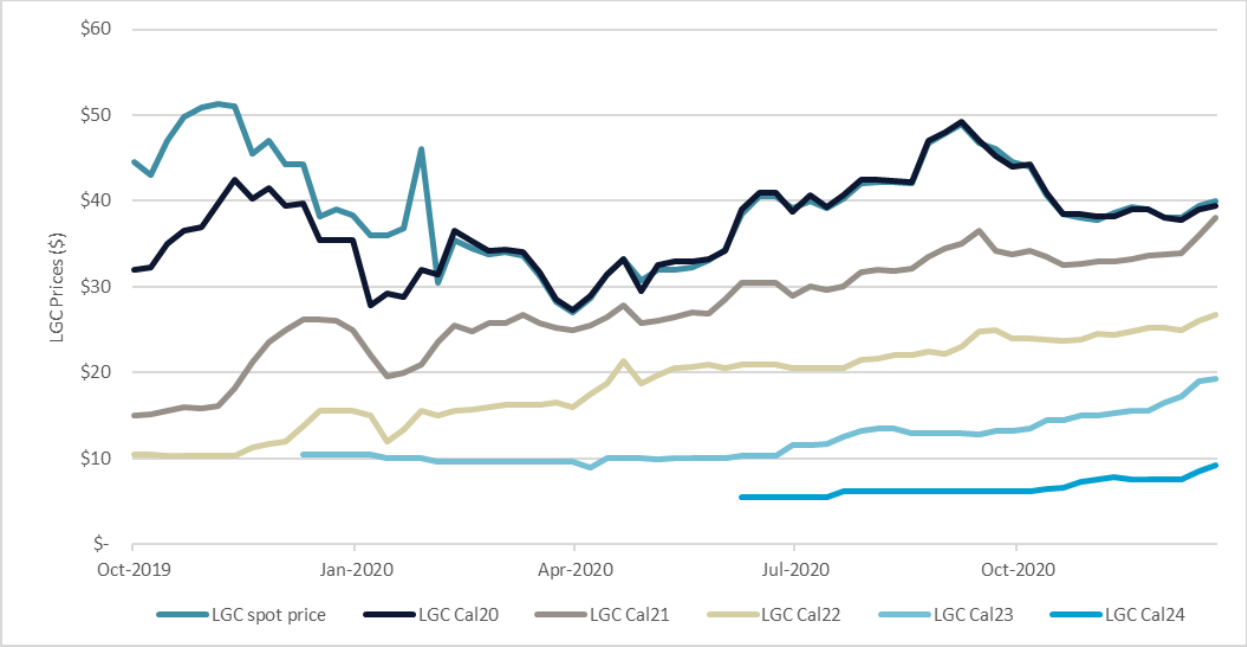
The LGC spot price experienced a 13% decrease in Quarter 4 2020, closing the quarter at $40.00 compared to $42.50 at the end of Quarter 3 2020 (see Figure 17). Prices experienced a sharp decline in October, dropping from $44.60 to $38.50 before steadily rising back to $40.00 throughout November and December.

LGC spot price patterns across Quarter 4 can be attributed to the subsequent surrender period as liable entities considered their options and decided their LGC positions.

A confluence of factors drove the LGC price spike observed from June to early October 2020; lower than expected LGC supply and increased voluntary demand resulted in a short-term tightening of the market that resolved in Quarter 4 2020.

Calendar 21 LGC prices tracked around $5 below LGC spot prices for most of Quarter 4, before increasing sharply toward the spot price in late December. LGC forwards continued to incrementally rise across Quarter 4 2020 potentially owing to a previous underestimation of voluntary demand and the view it will continue to increase maintaining higher LGC prices in the outyears from 2022-2024.

Figure 17: LGC spot and forward prices ($AUD), Q4 2019 to Q4 2020



2.5. Key dates

Date	Event	Significance
30 March 2021	The renewable power percentage (RPP) is published on or before this date	The RPP aims to meet the annual target for renewable electricity set out in the legislation each year.
14 February 2022	Lodgement of energy acquisition statement and surrender of LGCs Submit Electricity Generation Returns	This will be the final date for liable entities to: • lodge their energy acquisition statement(s) and surrender LGCs for the assessment year, and • pay any applicable shortfall charges for the assessment year.

3. Small-scale technology certificates

- An estimated 3 GW of rooftop solar PV capacity was installed nationally in 2020, a 40% increase on the 2.2 GW installed in 2019.
    - 950 MW of rooftop solar PV capacity was installed in Quarter 4 2020, the highest capacity installed in a quarter since the SRES began and 27% up on the previous record set in Quarter 3 2020 of 760 MW.
- Between 3 and 4 GW of rooftop solar PV capacity is expected to be installed in 2021 as household demand remains strong. The lower bound estimate of 3 GW looks unlikely based on Quarter 4 2020 trends and early 2021 data.
- A balance of 14.7 million STCs remained in the market after the 15 February 2021 Quarter 4 surrender of approximately 6.4 million STCs.
- STC prices remained stable ending Quarter 4 2020 at $38.00.

3.1. Supply and demand balance

An estimated 3 GW of rooftop solar PV was installed across Australia in 2020, capable of generating an estimated 4 million MWh. Uptake was slightly more than the 2.9 GW expected by the Clean Energy Regulator (see Figure 18).

The rate of rooftop solar PV installations accelerated over Quarter 4, exceeding 110,000 installations with almost 1 GW of capacity. This is a 29% and 36% increase of installs and capacity respectively compared to Quarter 4 2019.

The record high levels of installed capacity resulted in a balance of 14.7 million STCs in the market after the 15 February 2021 Quarter 4 surrender of approximately 6.4 million STCs.

Annual installed rooftop solar PV capacity has increased, on average, 38% year on year in 2018, 2019 and 2020.

In the absence of any unforeseen negative event occurring, the Clean Energy Regulator expects between 3 and 4 GW of rooftop solar PV to be installed in 2021.

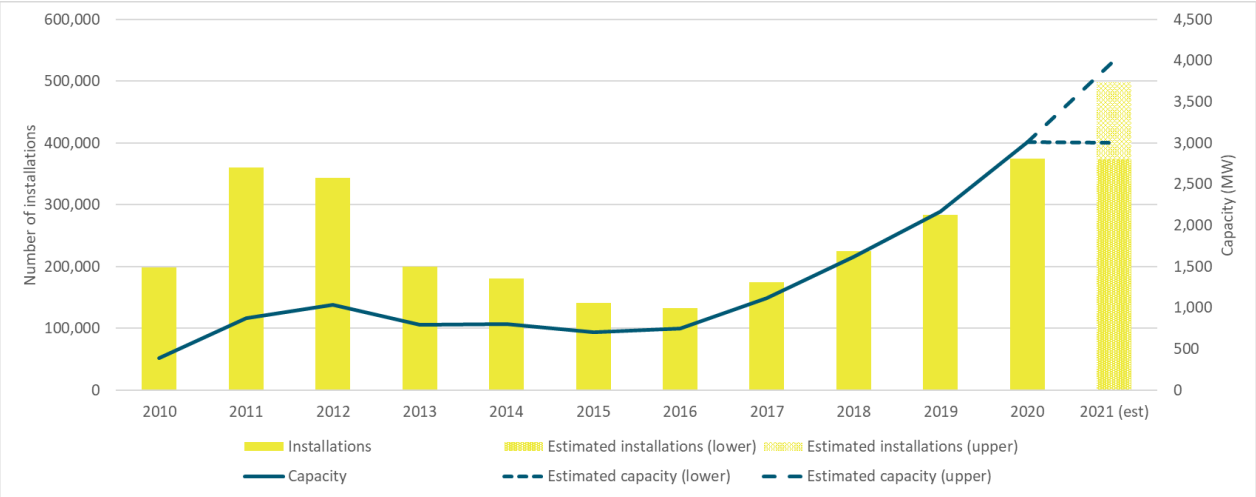
This estimate should not be taken as guidance for the 2021 small-scale technology percentage which takes into account factors set out by law and draws on modelling commissioned by the Clean Energy Regulator.[46] This modelling analyses the small-scale renewables market to forecast expected uptake and can be conservative. Conservatism has the benefit of ensuring there is sufficient liquidity for the market to operate.

The modelling indicated that investment in rooftop solar PV (0-100kW) would add, on average, 3 GW each year from 2020 to 2024. Yet growth in rooftop solar PV has continued to accelerate (currently up 30% in January 2021 compared to January 2020). If this level is maintained, installed capacity could be substantially higher with up to 4 GW installed in 2021.

[46] Results of projected rooftop solar PV capacity and installations as well as solar water heaters were reported in the September 2020 Quarterly Carbon Market Report.

The Clean Energy Regulator will make a firmer estimate for the year in the March Quarter 2021 Quarterly Carbon Market Report.

Figure 18: Small-scale solar PV installations and capacity (MW), 2010 to 2021



3.2. Factors impacting supply

Solar PV and installations

Over 950 MW of rooftop solar PV capacity was installed in Quarter 4 2020, the single largest quarter of installed capacity since the scheme began in 2001. This is 27% above the previous record in Quarter 3 2020 of 760 MW and 36% higher than Quarter 4 2019.

The average kW capacity of rooftop solar PV installations in the quarter was 8.5kW. Solar PV capacity and installations have increased by 36% and 29% respectively compared to Quarter 4 2019 (see Figure 19).

Sustained low technology costs, increased work from home arrangements and a shift in household spending to home improvements during COVID-19 contributed to this growth.

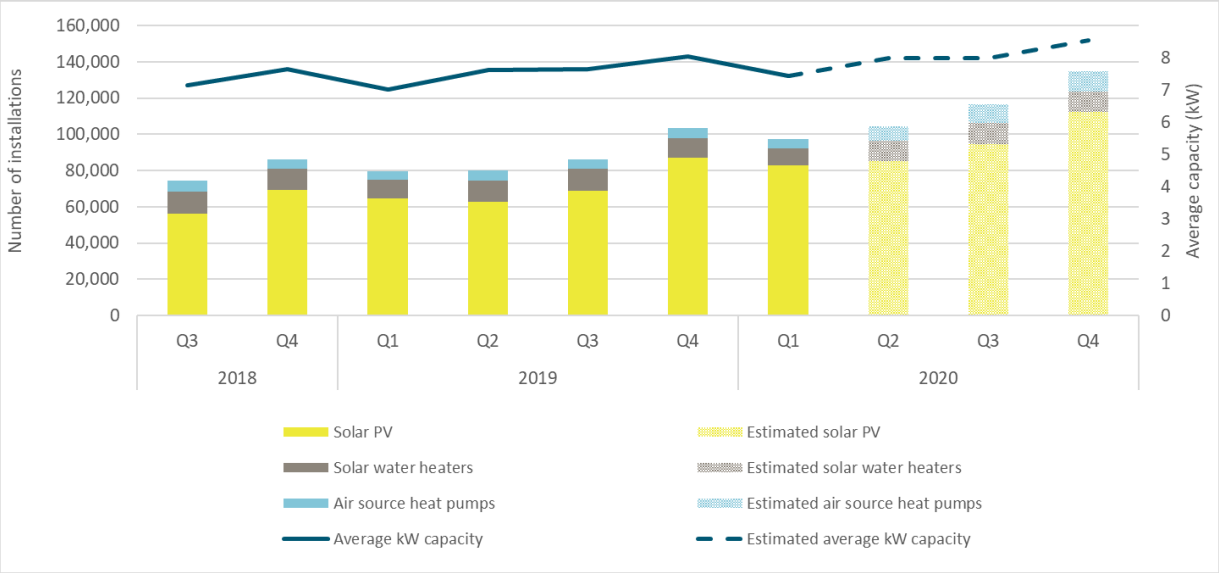
The trend towards larger systems noted in the June Quarter 2020 Quarterly Carbon Market Report continued in Quarter 4 2020. Quarter 4 2020 data shows notable increases between 8.5-9kW (78%), 9.5-10kW (169%) and 13-13.5kW (115%) compared to Quarter 4 2019. This increasing size of rooftop solar PV systems is contributing to higher STC creation rates.

The easing of Victoria's stage 4 COVID-19 restrictions on 19 October 2020[47] saw a swift return to pre-restriction installation levels with installed capacity in Metropolitan Melbourne increasing 106% from Quarter 3 2020 to Quarter 4 2020.

A large backlog, estimated at 15,000 installations of rooftop solar PV, accrued during the Stage 4 restrictions. It is expected that the backlog will continue to be installed in early 2021, further increasing what is already expected to be a large Quarter 1.

[47] The change in restrictions allowed for groups of up to 5 people to return to onsite work for solar panel installers, Premier of Victoria, Statement from the Premier, 18 October 2020.

Figure 19: SRES installations and average kW capacity, Q3 2018 to Q4 2020

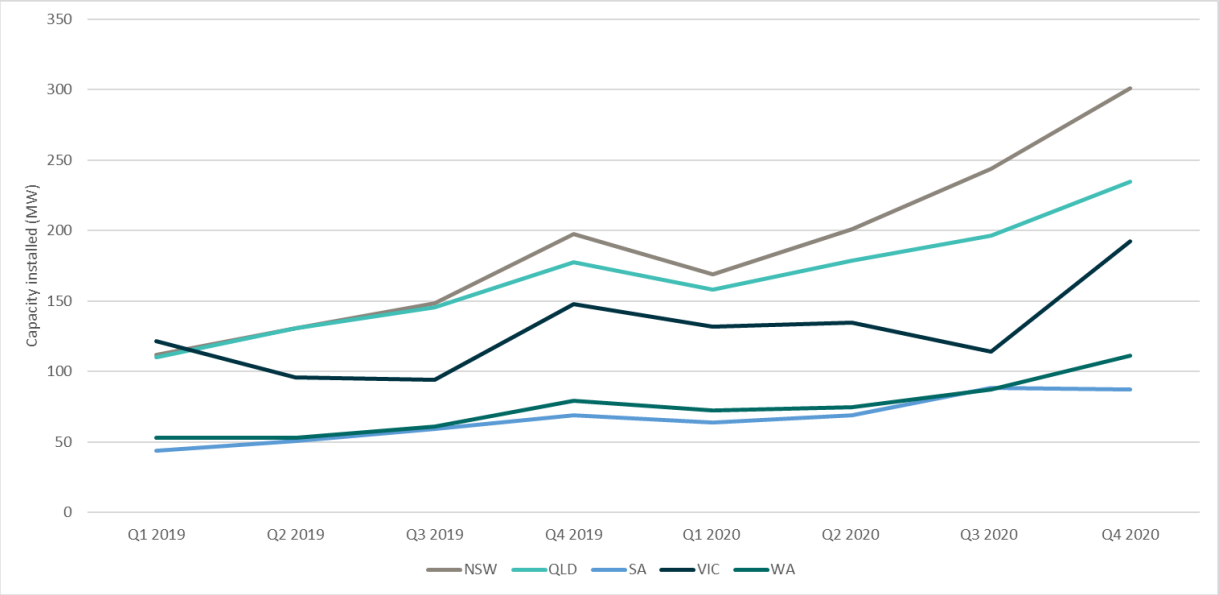


New South Wales continues to lead Queensland and Victoria in rooftop solar PV uptake, accounting for 311 MW of newly installed capacity throughout Quarter 4 (see Table 6). This was an increase of 57% on the capacity installed in the state in Quarter 4 2019. Queensland, Victoria and Western Australia also experienced growth in Quarter 4 2020 compared to Quarter 4 2019 (see Figure 20[48]).

An estimated 2,677 concurrent battery installations occurred in Quarter 4 2020, a 22% increase on the 2,187 concurrent batteries installed in Quarter 4 2019.[49]

This modest increase in battery installations may reflect that the capital cost of batteries remains a barrier for uptake, despite state and territory incentives. The introduction of community batteries may also be disrupting the uptake of individual residential batteries.

Figure 20: Solar PV capacity installed by state (MW), Q1 2019 to Q4 2020



[48] Figure 20 shows a potential decline in installed capacity in South Australia. This graph is based on lag adjusted data, as such it is too early to call a downward trend. This will be explored further in the March Quarter 2021 Quarterly Carbon Market Report.

[49] The Clean Energy Regulator's data only accounts for concurrent battery installations with solar PV system, it doesn't account for retrofit batteries into existing systems.

Table 6: Estimated rooftop solar PV (≤100 kW) capacity by state, Quarter 4 2020

	Estimated capacity (MW)
ACT	17
NSW	311
NT	6
QLD	241
SA	87
TAS	8
VIC	171
WA	117
Total	**957**

Solar water heaters and air source heat pump installations

Air source heat pump installations continue to grow strongly with a twofold increase, 5400 to 11,000 installations, in Quarter 4 2020 compared to Quarter 4 2019. Conversely, solar water heater installations in Quarter 4 2020 remained relatively stable with an 8% increase compared to Quarter 4 2019.

Total 2020 solar water heater and air source heat pump installations increased by over 20%, from 65,000 installations in 2019 to 78,000 installations. Air source heat pumps comprised of 44% of the energy efficient systems in the SRES, up from 32% in 2019.

The significant increase in air source heat pump installations may be attributable to lower costs than solar water heaters, compatibility with rooftop solar PV and a shift away from traditional electric or gas water heaters. This will be explored further in the March Quarter 2021 Quarterly Carbon Market Report.

3.3. Factors impacting demand

Quarterly surrender

6.4 million STCs were surrendered by 119 liable entities to meet their obligations on 15 February 2021. This was the final surrender period for the 2020 assessment year, representing 15% of total liability.

The compliance rate for Quarter 4 2020 was 100%, leaving a balance of 14.7 million STCs (see Figure 21). For context, this 14.7 million STC balance is only 200 thousand STCs less than what was required to be surrendered for Quarter 1 2020 – the largest surrender quarter at 35%.

3.4. Spot price

STC spot prices ranged from $37.75 to $38.40 throughout Quarter 4 2020. The Quarter ended at $38.00.

STC spot prices experienced a brief peak of $39.50 in March owing to market perception that COVID-19 would cause certificate scarcity in the lead up to Quarter 1 surrender which accounts for 35% of total liability for the year. After this peak, STC spot prices moderated and remained relatively stable throughout 2020 despite the significant surplus of STCs in the market (see Figure 22).

Figure 21: STC surplus after quarterly surrender (millions), 2020

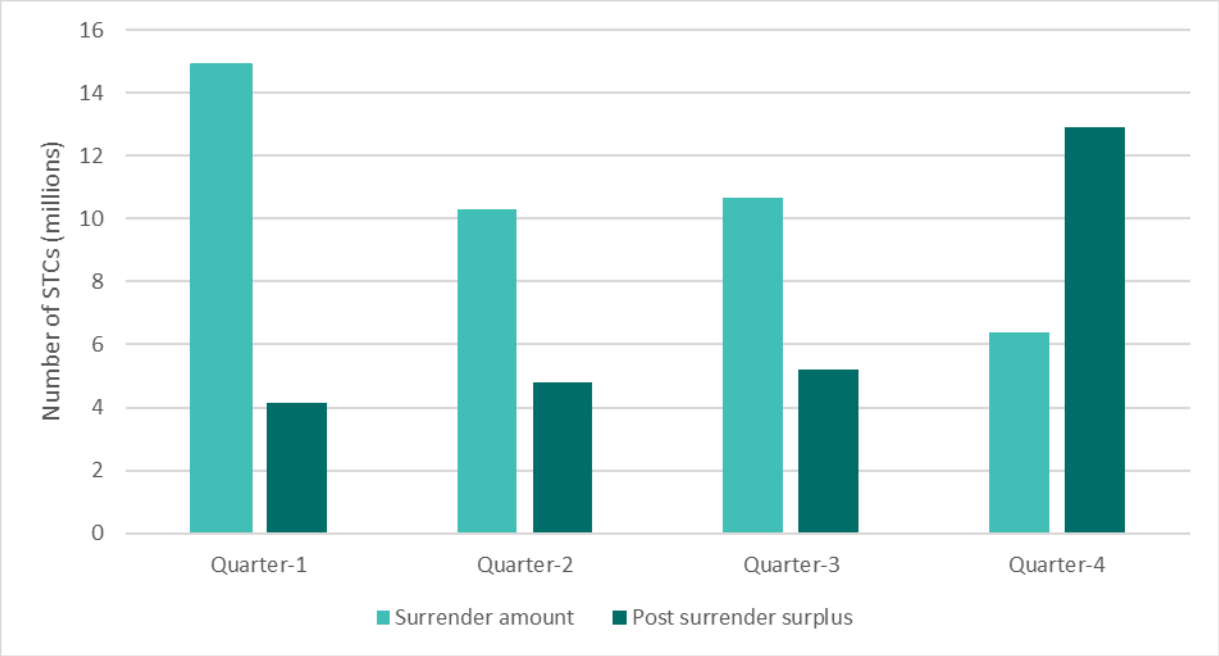
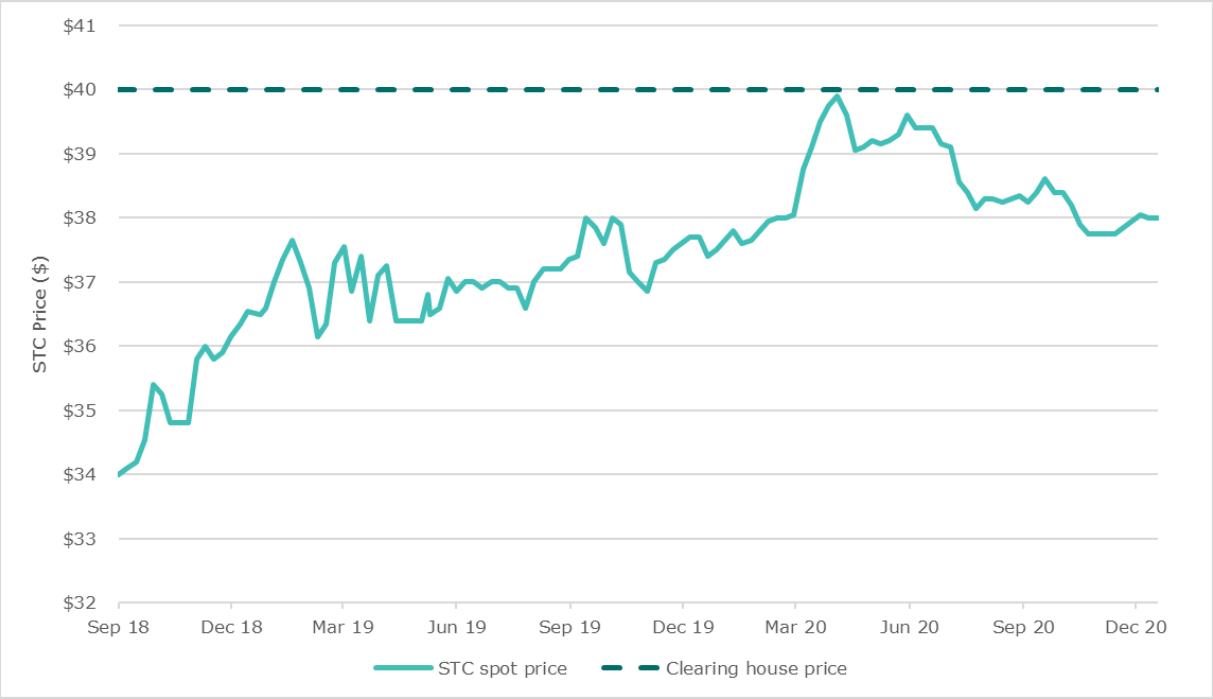


Figure 22: STC spot and clearing house prices ($AUD), Q3 2018 to Q4 2020



3.5. Key dates

Date	Event	Significance
29 October 2020 to 15 February 2021	Quarter 4 surrender period	A liable entity must surrender 15% of liability for the year in the REC Registry for this quarter. STC surrender liability for the fourth quarter of an assessment year must be made with the liable entity's energy acquisition statement for the year.
30 March 2021	2021 small-scale technology percentage (STP) announced on or before this date	The SRES aims to balance supply and demand by requiring all STCs that are created to be surrendered over time. To do this, the STP is set each year to require liable entities to surrender to the Clean Energy Regulator the same number of STCs as the number that are estimated to be created in that year, plus or minus an adjustment for previous under- or over-surrender.
16 February – 28 April 2021	Quarter 1 surrender period	A liable entity must surrender 35 per cent of liability for the year in the REC Registry for this quarter.
31 December 2021	Application for liable entity required surrender amount due	The final date for liable entities to apply to set their required surrender amount for quarters one to three where no energy acquisition statement was lodged by 1 April of the assessment year.

4. Renewables investment in 2020

4.1. Capacity delivered

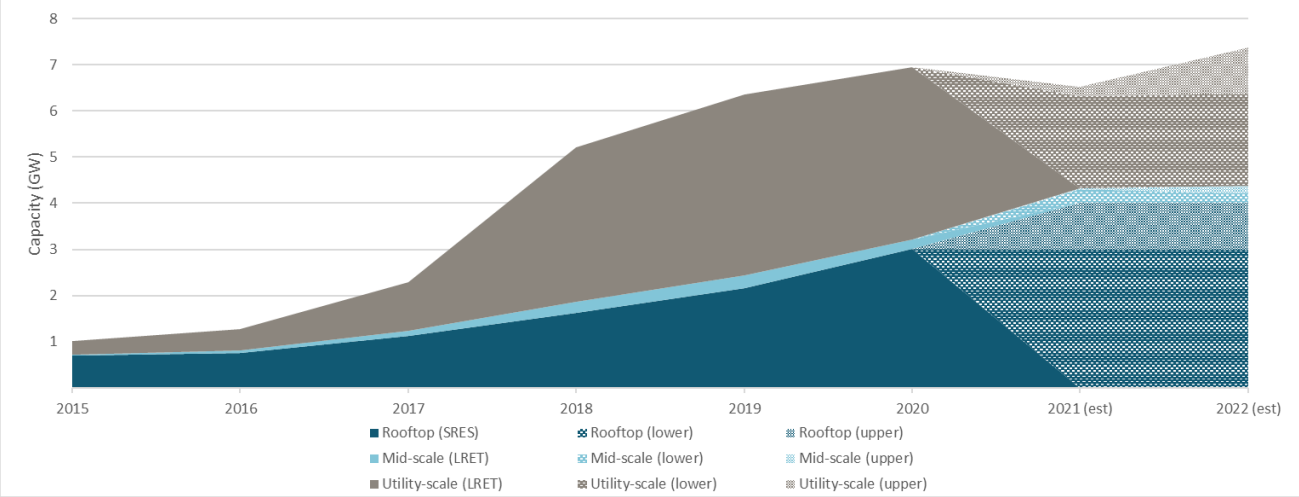
In 2020, 7 GW of new renewable energy capacity was delivered across Australia, up 11% from the previous record set in 2019 (see Figure 23). Of this, 4 GW was large-scale (2.3 GW wind and 1.7 GW solar, including mid-scale solar) and 3 GW was rooftop solar PV.

The Clean Energy Regulator expects 6 GW of new renewable capacity per year to be delivered in 2021 and 2022. Between 2 to 2.5 GW of large-scale capacity will be delivered in 2021 and between 3 to 4 GW of household and commercial rooftop solar is also expected in 2021.

The Clean Energy Regulator expects more large-scale solar than large-scale wind in 2021 due to the timing of large-scale projects. For mid-scale commercial solar, growth is anticipated as business activity returns to pre COVID-levels.

If the level of added capacity in 2021 and 2022 is realised, it would mean a consistent level of added capacity over the five-year period 2018-2022, noting that the proportion of large-scale projects to rooftop solar PV is expected to shift over this period.

Figure 23: Actual and estimated capacity installed[50] (GW), 2015 to 2022



4.2. Investment

Analysts and market commentators have been citing a collapse in renewable investment for several years. This has not eventuated.[51]

For 2020, financial investment is estimated at $9.7 billion, up 9% from the $8.9 billion in investment in 2019. [52] This equates to per capita investment of approximately $377 in Australia.[53]

There are different methodologies used to determine the scale of investment in renewables. The Clean Energy Regulator estimates that over the past 5 years $33.8 billion was invested in the Australian renewable energy industry based on delivered capacity. Bloomberg New Energy Finance estimates

[50] The data provided in this figure is based on the Clean Energy Regulator's pipeline of large-scale renewable energy projects, small-scale technology percentage modelling reports and capacity estimates derived by the Clean Energy Regulator. The upper bound estimate for 2022 SRES installations and assumes that expected 2021 trends will persist into 2022.

[51] The June Quarter 2020 Quarterly Carbon Market Report provides further information on the Clean Energy Regulator's approach to tracking renewables investment.

[52] See Measuring investment in renewables at the end of this chapter for a full explanation of the calculation methodology

[53] This is based on the Australian population at 30 June 2020 of 25,687,041, as reported by the ABS.

$35 billion has been invested in renewables since 2017 based on financial close decisions.

Of the $33.8 billion estimated by the Clean Energy Regulator, $10.5 billion was invested in rooftop solar PV, $1.6 billion was invested in mid-scale solar installations on premises[54], and $21.7 billion was invested in utility-scale renewable energy power stations.

Broken up by state, investment in the renewable industry in Australia over the past 5 years has been driven primarily by Victoria ($9.7 billion), New South Wales ($8.7 billion) and Queensland ($8 billion) (see Table 7).

A substantial portion of investment in the large-scale renewable industry has been underpinned by government and corporate PPAs. For more information see Chapter 2 Large-scale generation certificates.

It is estimated that a further $12.6 to $16 billion of new renewable investment will be made over 2021 and 2022 (see Figure 24).[55] The majority of investment in 2021 is expected to come from solar, which has a lower cost per watt than wind.

Year to year financial investment comparisons can be misleading, as they do not account for the declining cost of renewable energy. For context, the dollars per watt for utility-scale wind and solar has decreased 29% ($2.80 to $2.00) and 25% ($1.87 to $1.39)[56] respectively since 2015. Small-scale residential solar has decreased by 44% ($1.53 to $0.88)[57] across the same period. Due to the projected decline in costs of capital on a dollars per watt basis for both solar and wind[58], the installed capacity in the future is expected to outpace the level of financial investment.

Table 7: Renewable energy investment summary by state, total over 2015 to 2020 ($ million)

	SRES ($m.)	LRET ($m.)	Total ($m.)	%
ACT	$132	$94	$226	1%
NSW	$2,651	$6,034	$8,685	26%
NT	$182	$87	$270	1%
QLD	$2,782	$5,191	$7,973	24%
SA	$1,087	$2,310	$3,397	10%
TAS	$140	$554	$694	2%
VIC	$2,311	$7,374	$9,685	29%
WA	$1,255	$1,652	$2,907	9%
Total	$10,541	$23,296	$33,836	

[54] Mid-scale solar PV includes power stations between 100kW and 30 MW accredited under the Large-scale Renewable Energy Target.

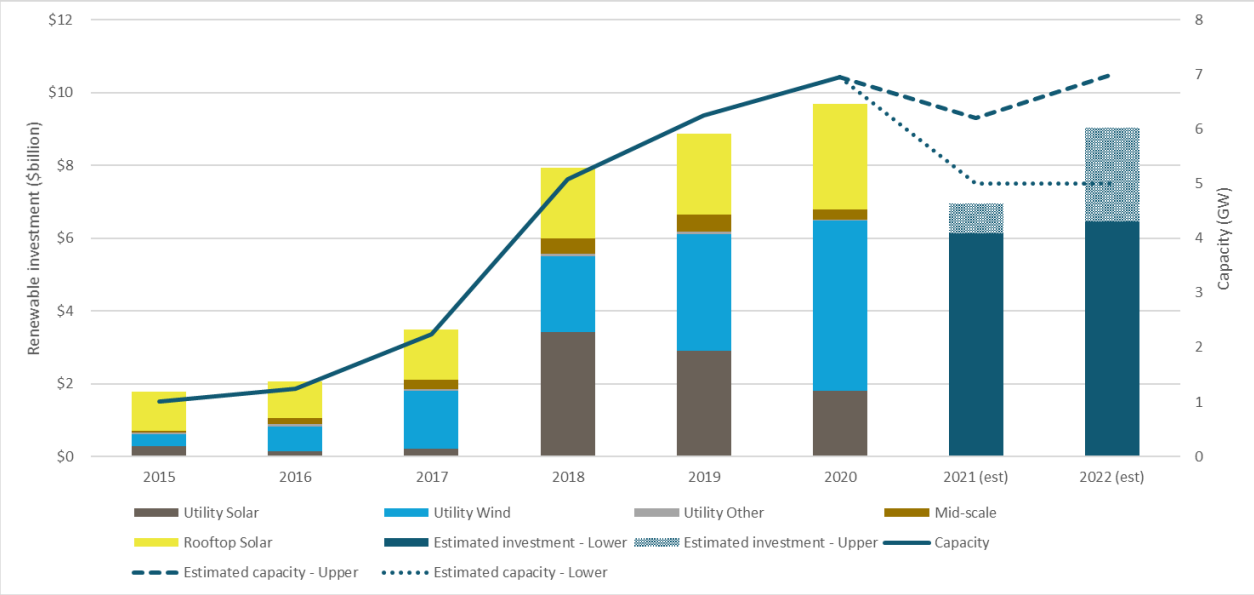
[55] This is based on current expectations of 2 to 3 GW in new utility-scale capacity, and 3 to 4 GW in new rooftop solar PV in 2021 and 2022. For more information on these expectations see Chapter 2 LGCs and Chapter 3 STCs.

[56] Based on capital cost data collected by the Clean Energy Regulator for utility-scale projects at the time of project completion.

[57] See Measuring investment in renewables at the end of this chapter for how this is calculated.

[58] CSIRO, GenCost 2020-21 Consultation Draft, December 2020.

Figure 24: Renewable energy investment ($billions, GW), 2015 to 2022



Measuring investment in renewables

The Clean Energy Regulator defines renewable investment as the investment delivered in a year. For small-scale solar (0-100kW) this is based on the estimated installed capacity for the year. For commercial and utility-scale renewables (wind, solar (>100kW) and biomass) this is capacity accredited under the Large-scale Renewable Energy Target.

The Clean Energy Regulator collects capital cost investment data from renewable energy power stations when power stations owners/operators apply for accreditation under the LRET.

For small-scale solar capacity under the SRES PV a combination of Solar Choice's Residential and Commercial Solar PV Price data (from January for each year) and the Clean Energy Regulator's rooftop solar PV capacity data has been used. The estimated total capacity is multiplied by the dollars per watt from Solar Choice's price data to obtain the estimated investment figure.

The LRET capital cost data, whilst not validated, is provided directly by the power station's owner or operator.

The Clean Energy Regulator uses the year in which a renewable energy power station was accredited to determine investment, as such this data typically lags other investment estimates. A power station's accreditation date typically refers to the date of first generation and is an effective measure of when the bulk of cost is incurred. Renewable energy power stations typically take 12 to 18 months to complete (with some power stations completing additional stages after first generation).

This approach contrasts with some measures of investment that record the investment value at the time of announcement or final investment decision which can often be significantly in advance of actual construction. The Clean Energy Regulator considers capacity to be the better metric to measure renewable energy investment.

5. Voluntary private and state and territory government markets

5.1. Domestic carbon market

Demand for ACCUs and LGCs for voluntary private, and state and territory government markets reached record levels in 2020. A total of 4.9 million units and certificates were surrendered in 2020, a four-fold increase from the volume surrendered in 2019.

Over 460,672 ACCUs and LGCs were surrendered in Quarter 4 2020, a 65% increase compared to Quarter 4 2019 (see Figure 25).

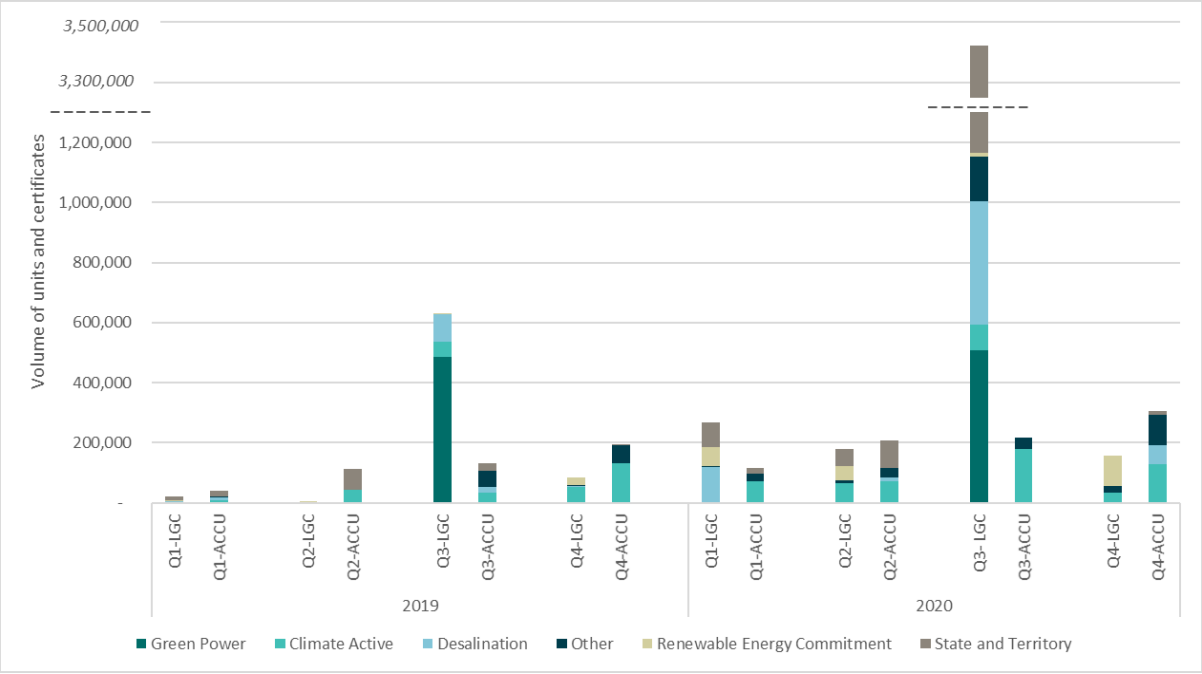
ACCU demand

Voluntary private and state and territory government demand for ACCUs totalled 304,000 in Quarter 4 2020, bringing total ACCU cancellations to 841,000 in 2020. This is a 76% increase on the 476,900 ACCUs cancelled in 2019.

The increase in demand in 2020 was driven in part by an increasing number of buyers choosing to use ACCUs for offsetting purposes, with 120 identified entities cancelling ACCUs in 2020, up from 68 entities in 2019.[59] Additionally, while international units, such as CER units, continue to dominate the voluntary market in terms of volume, the share of ACCUs is growing at a much faster pace with 76% growth in ANREU cancellations from 2019 to 2020 compared to 30% for that for CERs. This is likely due to ACCUs being valued as high integrity domestic units.

Further growth in participation is expected in 2021 leading to the voluntary private and state and territory government ACCU demand exceeding an estimated 1 million in 2021 (see Figure 26).

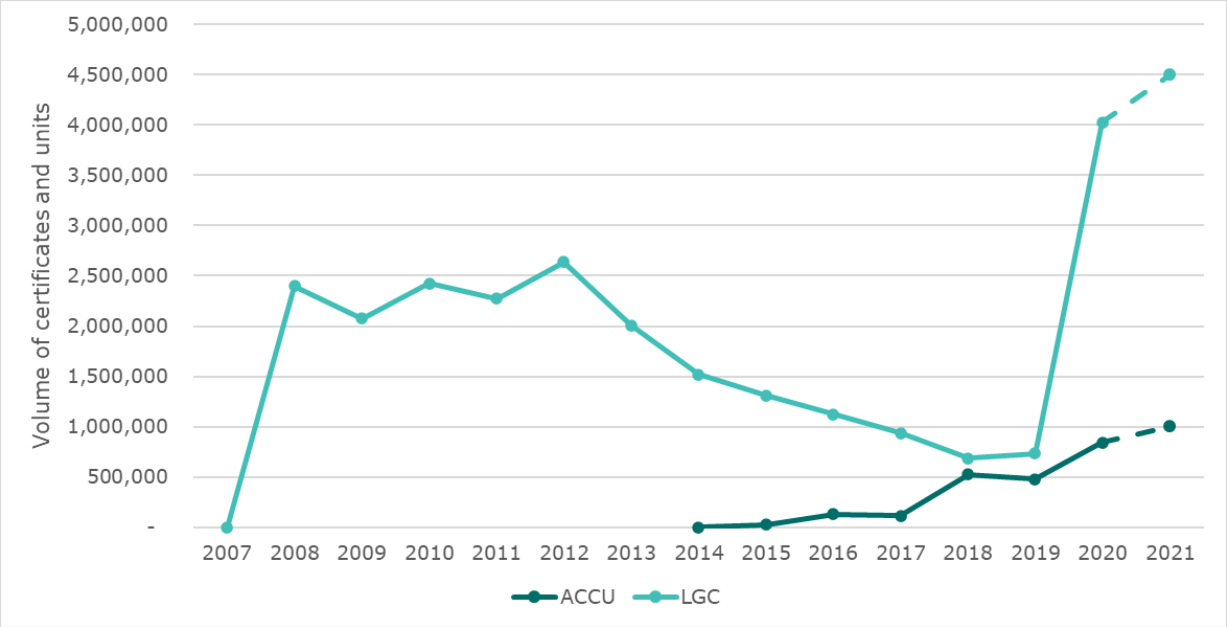
Figure 25: Voluntary private and state and territory government demand for ACCUs and LGCs^, Q4 2018 to Q4 2020



^Dashed lines indicate a break in the y-axis. Q3 2020 State and Territory LGC demand totals 2.3 million.

[59] The total number of buyers have been identified from ANREU transactions data. This excludes transactions where the reason for cancellation is unknown, totalling 13 transaction (15,000 ACCUs) in 2020 and 5 transactions (1300 ACCUs) in 2019.

Figure 26: Annual cancellation volume of ACCUs and LGCs, 2007 to 2021



Climate Active surrenders made up 53% of total voluntary private and state and territory government cancellations in 2020 with 447,000 ACCUs, double the volume surrendered in 2019 (215,000). Participation in the Climate Active initiative continues to grow with certification number increasing from 133 in 2019 to 209 at 2020.

Demand from desalination in 2020 (80,000 ACCUs) was nearly three times of that in 2019 (28,000 ACCUs). This was primarily due to SA Water surrendering ACCUs to offset emissions resulting from increased water production at the Adelaide Desalination Plant, which was associated with the Australian Government's 'Water for Fodder' program. The increased ACCU demand is unlikely to be repeated in 2021 as desalinated water production levels will not be as high given recent rain events, and investment in renewable energy by SA Water will reduce reliance on offsetting through ACCUs.

ACCUs from savanna burning and vegetation projects continue to meet the majority of voluntary demand, accounting for 92% of market share in 2020, as buyers continue to value these units likely for the broader benefits associated with the underlying projects (see Figure 27).

Record Climate Active certification using 100% ACCUs

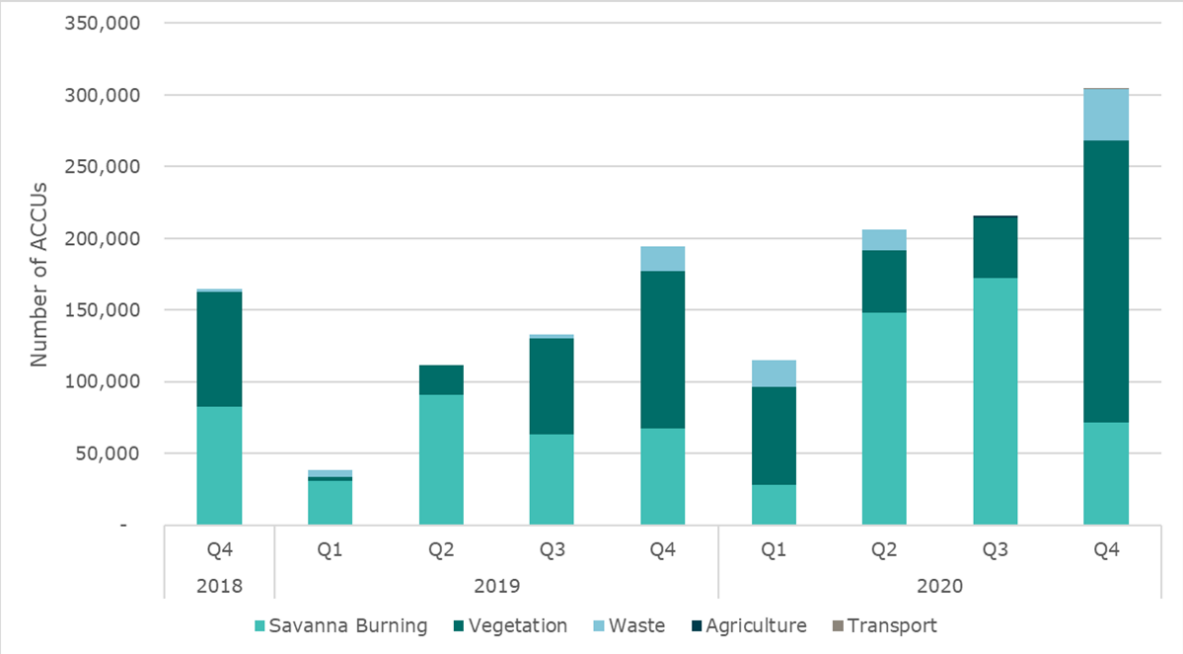
Property fund manager ISPT has claimed the largest carbon neutral certification under the Climate Active Carbon Neutral Standard using only ACCUs to offset emissions to date. ISPT invested in energy efficiency and onsite and offsite renewable energy generation to reduce emissions and cancelled nearly 74,000 ACCUs to offset remaining emissions for the 2019-20 period.[60]

ACCUs are high-integrity units that can deliver associated environmental and socio-economic co-benefits in Australia, in addition to emissions reductions. These co-benefits are valued by the market. For example, ISPT stated they procured ACCUs to invest in local communities, focusing on projects run by or connected to First Nations Australians.[61] Most of their ACCUs were sourced from savanna burning projects based in Arnhem land in Northern Territory and the northern-region of Queensland.

[60] ISPT, Climate Active Public Disclosure Statement, 2020

[61] ISPT is now carbon neutral

Figure 27: Voluntary private and state and territory government ACCU demand by method type, Q4 2018 to Q4 2020



LGC demand

156,000 LGCs were surrendered in Quarter 4 2020, bringing the total to over 4 million in 2020. The 2.3 million LGCs surrendered by the ACT Government accounted for 56% of the total volume surrendered in 2020.[62] Other surrenders in 2020 totalled 1.8 million, 2.4 times the amount surrendered in 2019 (736,000).

New demand sources for LGCs are emerging as Australian businesses set their own renewable targets or subscribe to international programs such as RE100. Within the quarter, Woolworths Group joined a number of Australian businesses[63], including Westpac, NAB and the Commonwealth Bank, in committing to source 100% renewable electricity under RE100. LGCs are recognised as high integrity renewable energy certificates under the RE100 program, and businesses can choose to surrender LGCs to meet their RE100 commitment.

Voluntary LGC surrenders are expected to increase in 2021 as more businesses use LGCs to reduce scope 2 emissions under Climate Active, set their own renewable targets or demonstrate renewable energy usage for programs such as RE100. In 2021, voluntary LGC surrenders are expected to increase to between 4.5 and 5.5 million[64].

5.2. Growth in voluntary market

Transparency in demonstrating emissions reduction action is expected to be the focus for businesses in 2021. Many businesses are now disclosing transition plans to achieve their respective emissions reduction targets.

Notable announcements in Quarter 4 2020 include:

- AustralianSuper, Australia's largest superannuation fund, committed to reach net zero emissions across its portfolio by 2050 with an interim target to invest more than $1 billion in renewable energy by 2022. AustralianSuper is the fourth major super fund to commit to a net-zero emissions target in 2020.[65]
- Santos announced a goal to reach net zero emissions by 2040. The target includes the proposed Moomba carbon capture and storage project which may be operational by 2024 and is expected to capture 1.7 million tonnes annually at an estimated cost of $30 per tonne of CO_2.

[62] For more information see the September Quarter 2020 Quarterly Carbon Market Report
[63] RE100, Woolworths joins the global RE100 renewable energy initiative, 11 November 2020
[64] This is a preliminary estimate based on current observed growth across the sectors and will be refined in the March Quarter 2021 Quarterly Carbon Market Report.
[65] ClimateWorks Australia, Net zero momentum tracker – superannuation sector, September 2020.

- Members of the Australian Industry Energy Transition Initiative, Orica and Woodside join those releasing short-term targets. Orica has committed to reduce operational emissions by 40% by 2030 and Woodside announced short-term target of a 25% reduction in emissions by 2025 and 30% by 2030, incorporating vegetation projects to offset emissions.

Corporate Emissions Reduction Transparency report consultation announced

The Clean Energy Regulator is consulting on the design of a new voluntary CERT report that will make it easy for NGER reporters to demonstrate how they are meeting their emissions reduction goals while supporting the growth of a vibrant carbon market.

The CERT report will be underpinned by the National Greenhouse and Energy Reporting scheme and will be available for the 2020-21 NGER reporting cycle. CERT is proposed to align with Climate Active, allowing the same eligible offset units and taking a similar approach to measuring net emissions.

Eligible corporations under the National Greenhouse and Energy Reporting scheme will be able to opt in to reference the CERT as a trusted source to support their claims of action and ambition to reduce their emissions or source renewable electricity.

Feedback on the CERT report and its draft guidelines can be provided to the Clean Energy Regulator by 5pm AEDT, 19 March 2021 by emailing: CER-RETandEnergySection@cleanenergyregulator.gov.au.

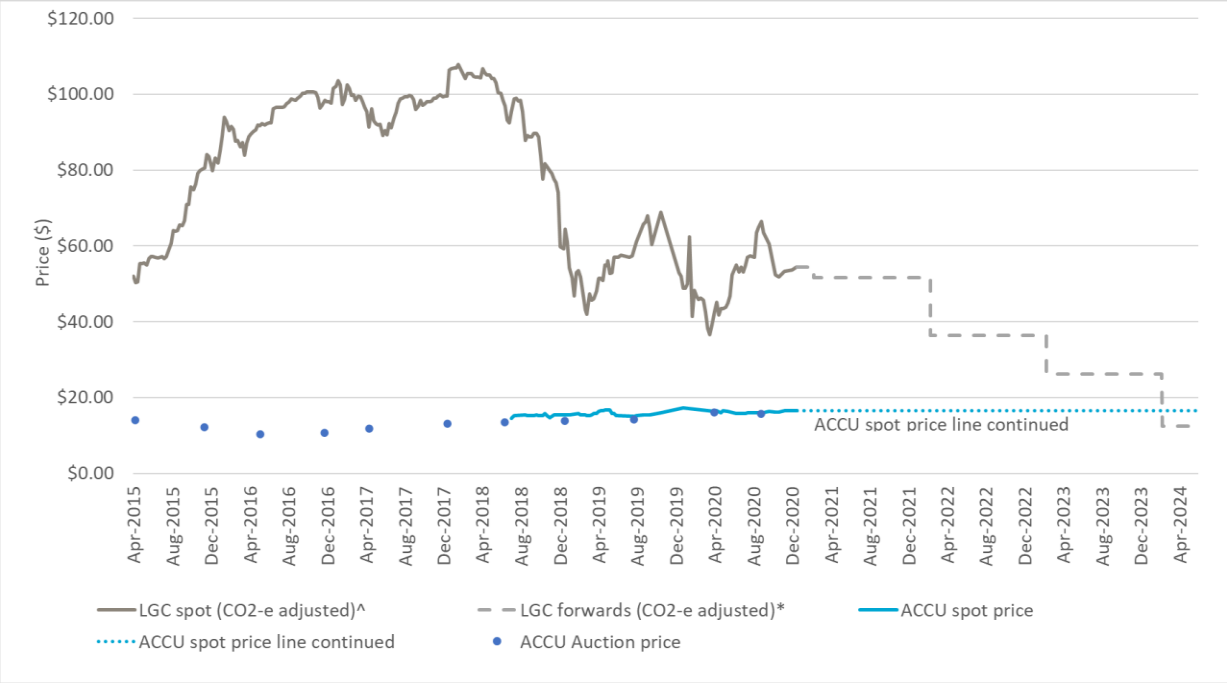
5.3. Prices

LGC spot prices decreased across Quarter 4 2020 after reaching a high of $49 in Quarter 3, likely due liable entities deciding their shortfall position.

Conversely, LGC forward prices increased across Quarter 4 2020 and have continued to climb, albeit moderately, in Quarter 1 2021.This is likely a result of high voluntary demand and shortfall refunds expected between 2021 and 2023.

The price of ACCUs and the equivalent carbon content of LGCs is expected to converge in early 2024 due to static statutory demand and increasing LGC forward prices (see Figure 28). The actual time of convergence will continue to fluctuate around this time as unit and certificate prices respond to market conditions.

Figure 28: ACCU and LGC price convergence ($AUD), 2015 to 2024^



^The convergence may occur earlier or later depending on the actual future LGC and ACCU prices. The estimate is based on continuation of current ACCU spot prices, as forward prices for ACCUs are not available. If, for example, ACCU prices rise and LGC prices fall further over this period the convergence will occur earlier.

5.4. Other units

European Union Allowances (EUA) reached a record high of $53.00 over the quarter, ending Quarter 4 2020 at $51.73 (see Table 8). The emissions trading scheme enters its fourth phase with steeper annual declines in allowances implemented to meet the European Union's 2030 target of a 43% reduction in emissions compared to 2005 levels.[66] This is expected to keep EUA prices high in the near-term.

New Zealand carbon unit (NZU) spot prices continued to increase in Quarter 4 2020, with prices also reaching a record high of $35.40, associated with tight supply in the market.

Following the end of Kyoto Protocol's second commitment period on 31 December 2020, the Clean Development Mechanism (CDM) will operate on a provisional basis until countries can decide whether the offset mechanism can transition into the Paris Agreement era at the COP26 to be held in November 2021. This will see an interruption to new CER supply in 2021.

[66] European Commission, Revision for phase 4 (2021-2030), 2020

Table 8: Domestic and international carbon market spot prices ($AUD)

Product	Spot price AUD (31 December 2020)[67]	Quarterly trend[68]
ACCU	$16.55	$0.45 (+2.8%)
LGC (CO_2-e)	$54.32	-$8.15 (-13.0%)
ESC	$28.30	$2.10 (+8.0%)
VEEC	$42.25	$7.00 (+20.0%)
CER	$0.57	$0.11 (+23.7%)
EUA	$51.73	$8.58 (+19.9%)
NZU	$34.92	$2.33 (+7.1%)
KAU	$27.60	$0.48 (+1.8%)

CERs - Certified emissions reduction (CER) units are issued through the Clean Development Mechanism.
EUA - European Union Allowances (EUA)
NZU - New Zealand Carbon Units (NZU)
KAU - Korean Allowance Units (KAU)
ESC - Energy Saving Certificates (NSW)
VEEC - Victorian Energy Efficiency Certificates

[67] Prices are converted to Australian dollars and were correct at time of conversion at 31 December 2020. Data sourced from Jarden, TFS Green, ICE, Korea Exchange.
[68] This is the quarterly trend from the end of Quarter 3 2020 to the end of Quarter 4 2020.

6. Emissions reduction

Emissions reduction from the schemes administered by the Clean Energy Regulator reached 53.3 million tonnes of CO_2-e in 2020 (see Figure 29).[69] This is an increase of 11% compared to 48 million tonnes in 2019.

Of this, 14.3 million tonnes came from the SRES and 23 million tonnes from the LRET, up 20% and 8% respectively from 2019. The ERF delivered ACCUs representing a further 16 million tonnes of emissions reduction in 2020, an 8% increase from 2019.

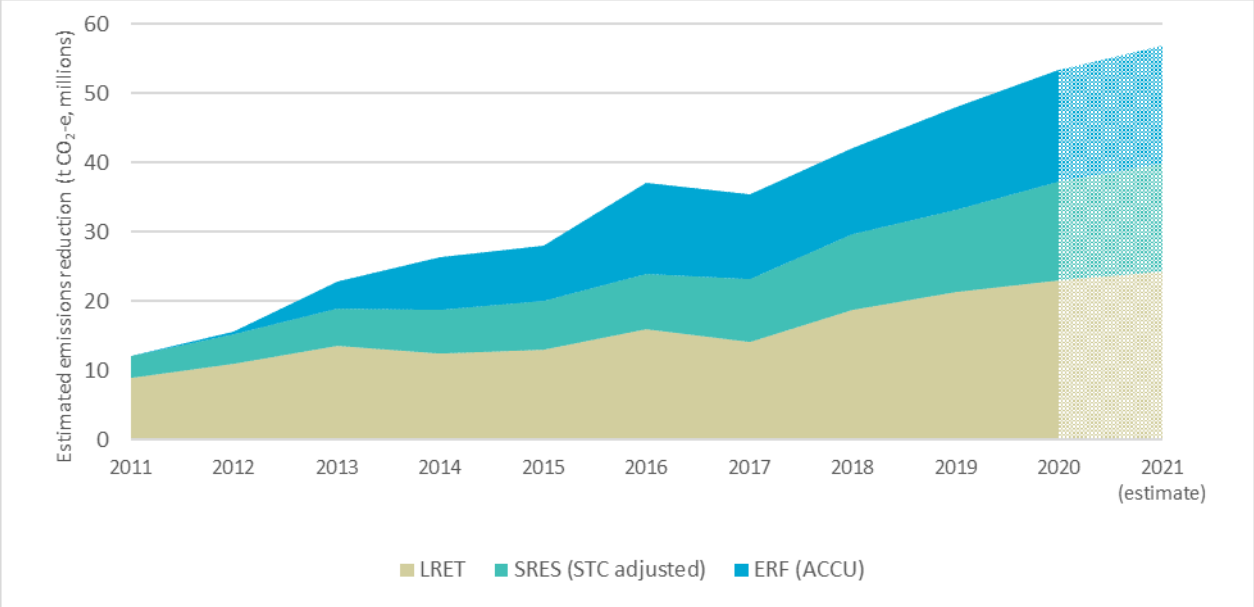
Overall, total emissions reduction in 2020 was one million tonnes lower than previously estimated by the Clean Energy Regulator, owing to lower than expected LRET generation and the falling average emissions intensity factor.[70]

The Clean Energy Regulator's estimate for scheme-based emissions reduction in 2021 is 56.9 million tonnes of CO_2-e (see Figure 29).[71]

Approximately 24.3 million tonnes of this are estimated to come from the LRET, with about 11% or 2.6 million tonnes of CO_2-e corresponding to 4,000 GWh generation achieved due to voluntary demand for LGCs.

The ERF and the SRES are expected to deliver 17 and 15.5 million tonnes of emissions reduction respectively in 2021. As highlighted in Chapter 1 Australian Carbon Credit Units, the ERF supply is estimated to increase in 2021 with a number of projects expected to be credited for the first time. Rooftop solar installations are expected to remain elevated driven by strong household demand (see Chapter 2 Small-Scale Technology Certificates).

Figure 29: Estimated emissions reduction from ERF and RET (t CO_2-e, millions), 2011 to 2021[72]



[69] The Clean Energy Regulator's emissions reduction estimation methodology is considered conservative. The methodology uses an emissions intensity factor to derive estimated emissions reduction. The emissions intensity factor is falling largely due to increasing penetration of renewables in the generation mix. The falling emissions intensity factor drives down the estimated abatement.

[70] Expected annual generation from the LRET in 2020 has been revised down to 32,300 GWh from 33,000 GWh. The average NEM emissions intensity factor fell to 0.7115 by 1% from the estimate used in Quarter 2 (0.7194).

[71] The Clean Energy Regulator's estimation methodology has assumed a sharp decline in emissions intensity factor for 2021.Based on a trend projection using historical data, the average NEM grid emissions intensity factor is estimated to fall from 0.7115 in 2020 to 0.6575 in 2021. The NEM is used as a proximation for the national emissions intensity. The Clean Energy Regulator will review the forecast accuracy of the estimated 2021 emissions intensity factor at the end of this year and update the associated emissions reduction in the December Quarter 2021 Quarterly Carbon Market Report accordingly.

[72] Estimated emissions reduction from the LRET in 2021 includes 2.6 million tonnes of CO_2-e corresponding to 4,000 GWh generation expected from voluntary demand for LGCs. Annual values used in this graph are slightly different from those reported in previous QCMRs for some years due to updated generation, emissions intensity factor, scheme information and minor revisions to the methodology.

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Glossary

Term	Acronym
Australian carbon credit unit	ACCU
Australian Energy Market Operator	AEMO
Australian Energy Regulator	AER
Australian National Registry of Emissions Units	ANREU
Australian Renewable Energy Agency	ARENA
Certified emission reduction unit	CER
Climate Solutions Fund	CSF
Emissions Reduction Fund	ERF
Energy saving unit	ESC
EU allowance unit	EUA
Integrated Systems Plan	ISP
Gigawatt	GW
Large-scale generation certificate	LGC
Large-scale Renewable Energy Target	LRET
Land Restoration Fund	LRF
Marginal loss factor	MLF
Megawatt	MW
National Electricity Market	NEM
National Greenhouse and Energy Reporting Act 2007	NGER
New Zealand unit	NZU
Power purchase agreement	PPA
Renewable Energy Certificate Registry	REC Registry
Renewable Energy Target	RET
Renewable power percentage	RPP
Small-scale Renewable Energy Scheme	SRES
Small-scale technology certificate	STC
Small-scale technology percentage	STP
Verified carbon unit	VCU
Victorian energy efficiency certificate	VEEC
Verified emission reduction unit	VER

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