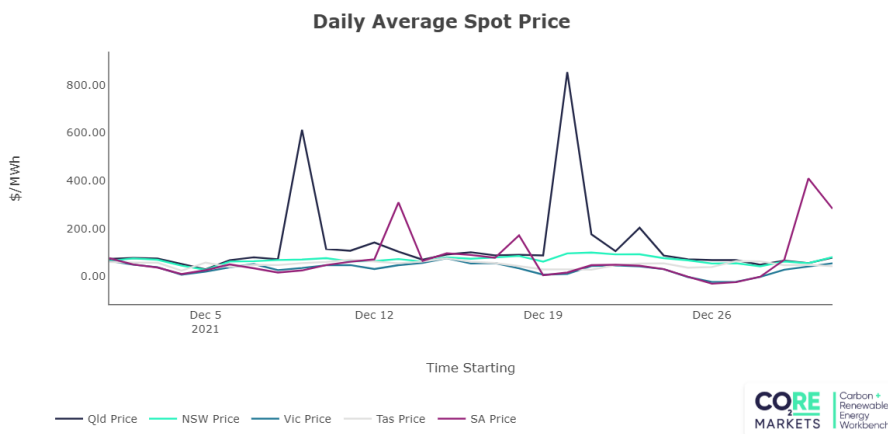


Market Update

A monthly energy & carbon market update

- AEMO's 2021-22 Summer Readiness Plan predicting no supply shortfalls thanks to additional VRE capacity able to offset offline thermal generation units.
- Queensland and South Australia experienced electricity spot market volatility due to irregular high pricing events.
- While LNG netback prices remain high, gas prices fell on average by 30% across the mainland NEM states while Queensland's only experienced a 13% drop.
- Flat Future prices trend upwards for most states.
- ACCU's continue their bullish run, surpassing \$50/certificate.
- STCs continue to remain very flat since the end of October, holding steady at \$39/certificate.
- LGCs saw a minor uplift in value across all vintages for the month of December.
- AEMO released their draft 2022 Integrated System Plan (ISP) in which they are expecting 14 GW of coal-fired capacity to be closed this decade due to ongoing commercial and operating challenges among those power plants.
- Victoria's Big Battery officially commenced operation on December 8th and is now Australia's biggest battery storage system with a capacity of 300MW/450MWh.
- CSIRO's annual GenCost 2021-22 draft report shows solar and wind clearly being the cheapest form of energy generation, even at high VRE 90% share with storage and network investments costs considered.

Spot market electricity price – December 2021



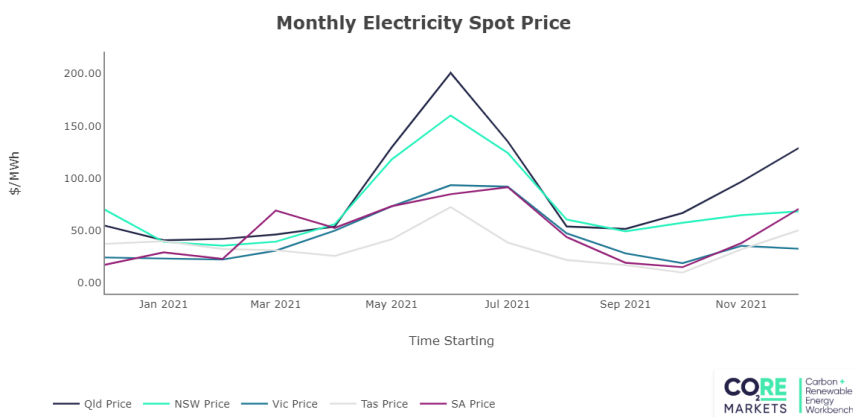
For the month of December, hot and humid La Niña weather conditions in Queensland led to higher demand, and with continued tight supply from the absence of Swanbank E and Callide C, plus interconnector constraints, high pricing events in Queensland followed.

Meanwhile, South Australia's volatility stems from downturns in wind or solar output while gas generation has dropped in part due to new state-backed synchronous condensers reducing curtailment among renewables.

Queensland saw the highest monthly average spot price this month at \$128/MWh. Excluding the two days of prices >\$500/MWh, the monthly average spot price would have been \$87/MWh. Likewise, the four days of spot prices >\$100/MWh in South Australia pushed its monthly average from \$37/MWh (exclusive) to \$70.3/MWh (inclusive).

The energy prices in the remaining three NEM states were stable with a monthly average electricity price of \$68.0/MWh for New South Wales, \$32.2/MWh for Victoria and \$49.9/MWh for Tasmania.

Spot market electricity price – rolling monthly average

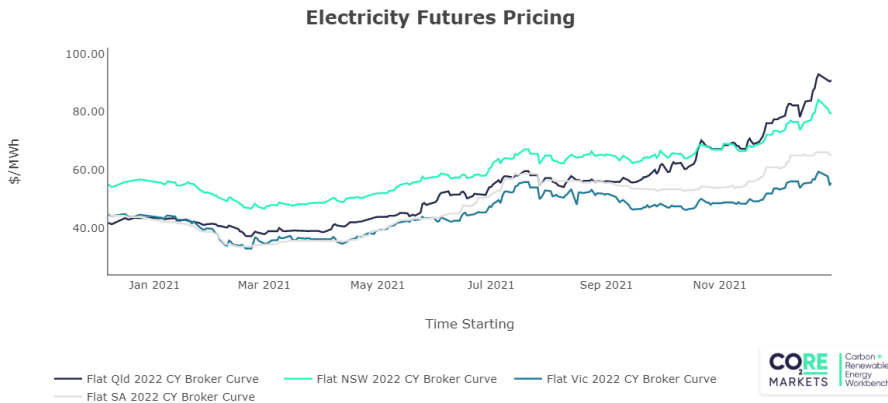


The month of December saw a rise in average electricity prices for Queensland, South Australia, and Tasmania – a continuing trend since October.

Queensland saw a 33% month-on-month increase for December from \$96.6/MWh to \$128.6/MWh. South Australia saw a dramatic 87% increase from \$37.7/MWh to \$70.3/MWh, and a 57% increase for Tasmania from \$31.8/MWh to \$49.9/MWh. Both Queensland and South Australia's increase in its monthly average spot price stems from their days of irregular high pricing events as previously discussed above.

Conversely, New South Wales saw a minor increase of 5% to \$68.0/MWh while Victoria was the sole NEM region to see its monthly average decrease by 8% to \$32.2/MWh.

Futures contracts – past 12 months



Like the previous month of November, Flat Futures contracts for 2022 were heavily influenced by the NEM gas price trends. Gas prices peaked NEM-wide in the middle of December, reaching a monthly high for different states, before sharply declining by 35% to return to pre-November gas price ranges. This was reflected in Futures pricing with a ~10-day lag time.

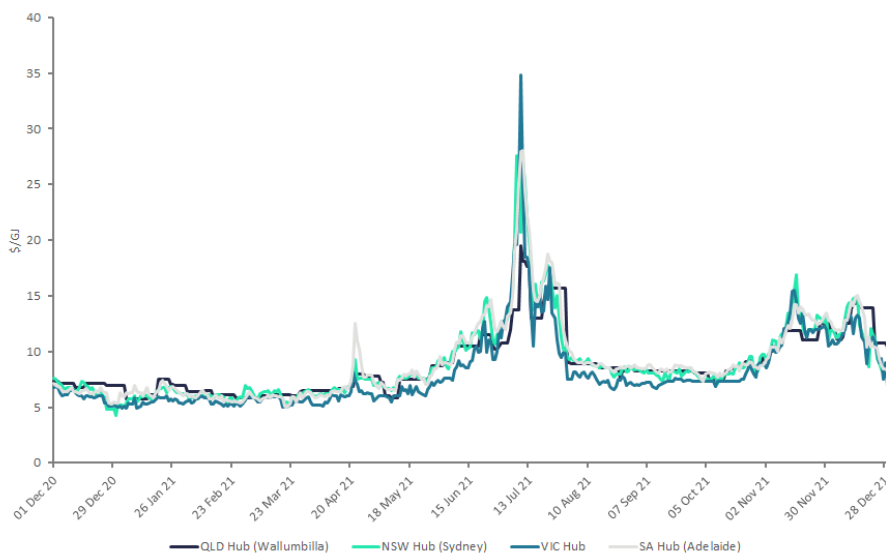
Queensland Futures rose the most by 17% throughout December from \$77.4/MWh to \$90.8/MWh (peaking at \$92.9/MWh), as tight energy supply conditions mentioned earlier continued to place upwards pressure on Future prices.

New South Wales futures pricing trended upwards from \$73.4/MWh to \$79.3/MWh (peaking at \$84.1/MWh) due to its link to Queensland through their interconnectors.

Victoria saw minor increase in its Futures price from \$53.6/MWh to \$55.4/MWh (peaking at \$59.4/MWh).

South Australia saw a modest increase from \$60.9/MWh to \$65.0/MWh. Unlike other states, it was less influenced from gas prices as its new synchronous condensers allow for more VRE before curtailment; reducing its gas demand.

East coast gas prices – past 12 months

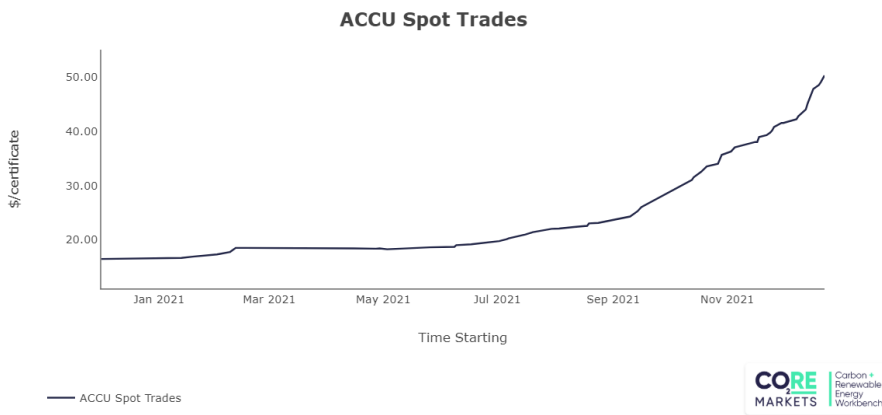


The daily gas spot price NEM-wide has decreased by 30% over the course of December; the 7-day moving average decreasing by \$3.5/GJ. The end of December saw gas prices mostly returning to pre-November gas price ranges.

Queensland gas prices remain higher on average, with only a 13% decrease in its 7-day moving average from \$12.1/GJ at the start of December to end at \$10.5/GJ. The remaining states saw a 30-35% decrease in their 7-day moving average throughout December; New South Wales was down from \$12.6/GJ to \$8.3/GJ, Victoria was down from \$11.9/GJ to \$8.2/GJ; and South Australia was down from \$12.9/GJ to \$8.4/GJ.

Queensland's gas prices remain high as the Japan-Korea LNG netback prices reached a new high at \$41/GJ. This is the third month in a row where prices have been above \$35/GJ. Despite the historical relation between the netback and NEM gas prices, this does not appear to be the case here. The overall warmer weather has reduced gas demand and likely behind the drop in mainland NEM gas prices.

Environmental certificates market – ACCUs

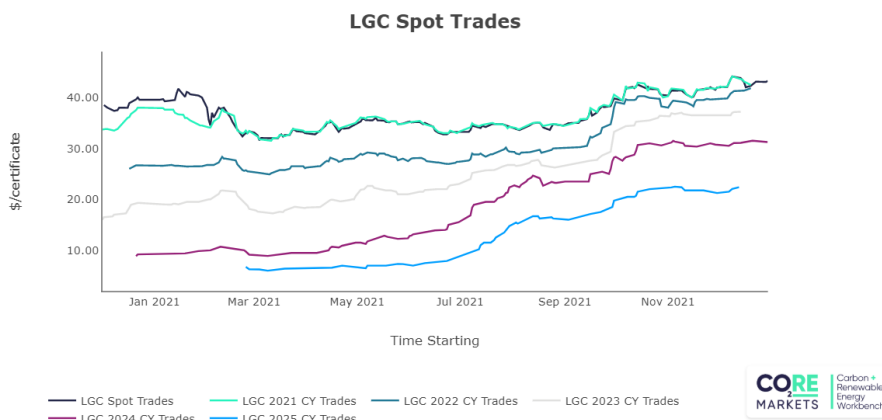


ACCU prices continue to trend upwards with a 21% increase from \$41.50/cert to \$50.25/cert throughout the month of December, surpassing the \$50/cert threshold.

Continued voluntary buying from corporates and investors have been integral to driving ACCU prices higher. There is little indication of ACCU's bullish run ending any time soon as investor participation continues to grow and more corporate net-zero emissions pledges.

This tight supply and increased demand are expected to continue providing forward momentum to ACCU prices in the foreseeable future.

Environmental certificates market – LGCs



Corporate demand continues to keep LGC prices steady across the board in the recent months.

December saw little movement in LGC prices, though all trended upwards on average by 3.0%. Cal 22 and Cal25 saw the highest percentage shifts of 5.2% and 5.4%, respectively.

LGCs	Curve	Last Trade
Spot	43.25	44.40
Cal 21	42.45	42.45
Cal 22	41.80	43.00
Cal 23	37.20	37.20
Cal 24	31.25	31.30
Cal 25	22.40	22.40

Environmental certificates market – STCs



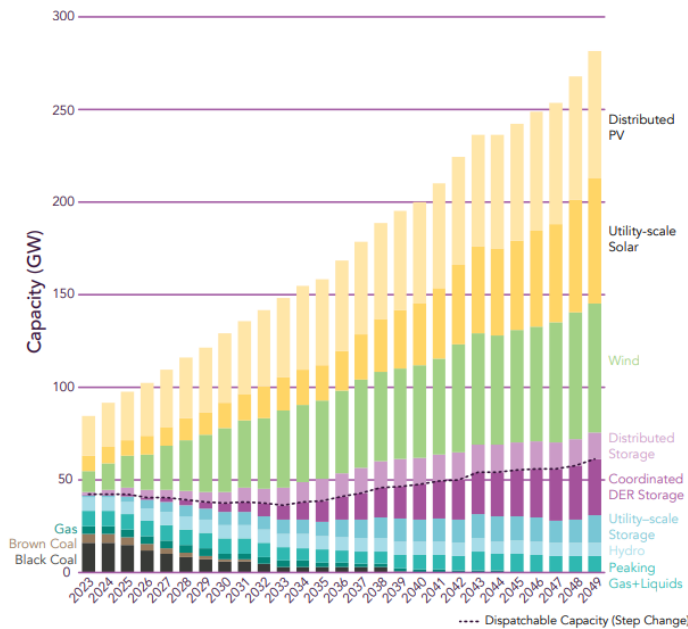
STC prices have remained flat since the Retailer Q3 surrender deadline at the end of October. The month of December saw prices end on \$39.10/cert from \$39.05/cert at the start of the month.

The average STC creation numbers for December remained similar to November's at roughly 965k per week. However, almost all of December's STCs were generated in the first three weeks due to the Christmas shutdown where only 150k were created.

Despite Retailers having a much lower percentage surrender requirement for the February quarter, prices have remained high as sellers begin to hold back volume in anticipation of the new yearly target announced by the CER typically in March which is designed to absorb any excess certificates in the market.

Feature 1: AEMO 2022 Integrated System Plan

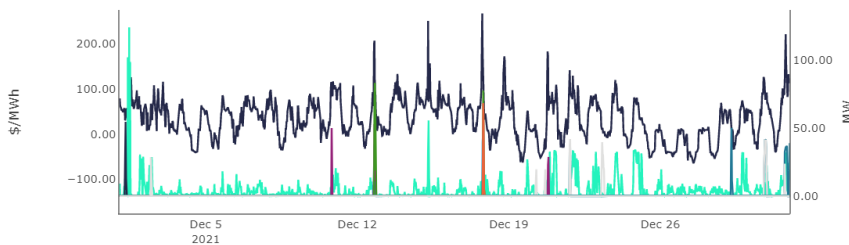
Forecast NEM capacity to 2050, Step Change scenario



Source: AEMO

Feature 2: The Victorian Big Battery

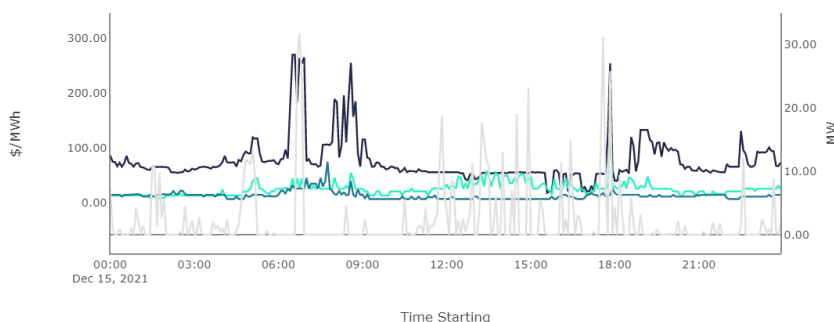
Victorian Big Battery



- Vic Price
- Bairnsdale Power Station (BDL01)
- Jeeralang "A" Power Station (JLA01)
- Jeeralang "B" Power Station (JLB01)
- Valley Power Peaking Facility (VPGS2)
- Valley Power Peaking Facility (VPGS4)
- Victorian Big Battery (VBBG1)
- Bairnsdale Power Station (BDL02)
- Jeeralang "A" Power Station (JLA02)
- Jeeralang "B" Power Station (JLB02)
- Valley Power Peaking Facility (VPGS3)
- Valley Power Peaking Facility (VPGS5)



Victorian Big Battery, December 15 2021



- Vic Price
- Vic Raise Reg RRP
- Vic Lower Reg RRP
- Victorian Big Battery (VBBG1)



AEMO released its draft 2022 ISP for consultation early December. Their new central Step Change view is that Australia's electricity transition is accelerating at an unrepeating pace and assumes coal closures will occur at 3x the expected rate.

A major highlight is that 14GW of thermal generation is expected to retire by 2030 as they are pushed out by rooftop solar and large scale renewables. This is almost 3x the expected 5GW of retirements currently scheduled.

For this to occur though, significant investment in the NEM is required to double the amount of currently delivered electricity to 330 TWh by 2050. In order to achieve this, and without coal generation, a 9x increase in utility-scale variable renewable energy (VRE) capacity and a 5x increase in distributed PV.

The draft ISP also highlights the need to adapt networks and markets for two-way electricity flow, more than 10,000km of new transmission, and to triple firming capacity to 60GW provided by batteries, hydro, gas or virtual powerplants.

The Victoria Big Battery (VBB) officially commenced operation December 8th 2021, and is now Australia's largest battery storage system with a capacity of 300MW/450MWh.

Situated at Moorabool near Geelong, the VBB took less than a year to build, including a delay in its commissioning process when one of its Tesla Megapack units caught fire.

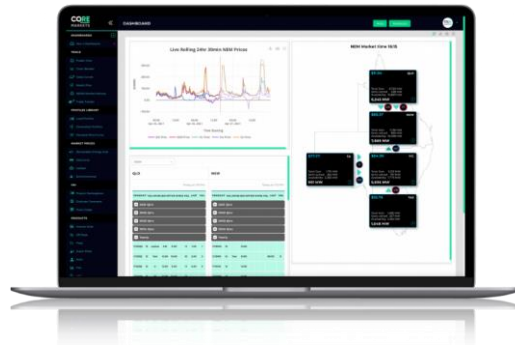
It has a 10-year contract with AEMO to bolster the capacity of the transmission link between Victoria and New South Wales at peak demand times during summer, which will account for 250MW/125MWh of its capacity during that time. Moreover, 80% of its capacity is generally reserved for moments when Victoria's energy supply is under high stress, such as any failures from ageing coal-fired generators.

In the first figure left, we see that during the first month of operation, it is operating well below its maximum capacity (the 200MW seen on Dec 1st was part of its testing phase) and rarely exceeds 50 MW; this is on par with some of Victoria's smaller gas-peaker plants. Whether or not future Big Battery installations will replace them will remain to be seen.

The second figure shows the VBB operation throughout a standard day where it is primarily operating in the FCAS and arbitrage markets.

Feature: CORE Markets – the game-changing SaaS platform for carbon & energy markets

CORE
2
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Energy
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Asset contracting scenarios



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Renewable Energy Hub, together with the teams at Tradition and TFS Green, and our funding partner ARENA, are proud to release our digital workbench CORE Markets.

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On CORE Markets, you will gain exposure to all major energy trading counterparties in the NEM, enabling you to access transactions in both standard and Renewable Energy Hub's innovative energy futures contracts, as well as liquid markets in the full suite of environmental products. Our roadmap includes further capabilities that will provide critical asset contracting scenarios and commercial analysis.

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We are part of global financial services company [Tradition](#), located in 29 countries worldwide.

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We trade Australia's largest volume of environmental certificates annually.

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