



CLIMATE ENERGY FINANCE

Australia is seeing an Acceleration in our Electricity Sector Transition, putting our 82% Renewables by 2030 Target in reach

Sustained new investment and policy support is key, as is accelerated planning evaluation and approvals

17 December 2024

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Established in 2022, [Climate Energy Finance](#) (CEF) is an Australian based, philanthropically funded think tank. We work pro-bono in the public interest on mobilising capital at the scale needed to accelerate decarbonisation consistent with climate science. Our analyses focus on global financial issues related to the energy transition, and the implications for the Australian economy, with a key focus on the threats and opportunities for Australian investments and exports. Beyond Australia, CEF's geographic focus is the greater Asian region as the priority destination for Australian exports. CEF also examines convergence of technology trends in power, transport, mining and industry in accelerating decarbonisation. CEF is independent, non-partisan, and works with partners in the NGO, finance, business, research, and government sectors.

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We pay our respects to the Traditional Owners of the unceded lands on which we live and work.

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Executive Summary

Australia's 2030 renewable energy target

The Federal Labor Government has an ambitious target to achieve an 82% renewables share in electricity generation in the National Electricity Market (NEM) by 2030 – key to achievement of its broader emissions reduction and economy-wide decarbonisation goals.

After many wasted years recently, progress over 2024 has accelerated. Over the last six months the level of activity and monthly renewables share, if sustained, puts Australia on track to deliver on this ambitious 82% by 2030 target.

The Clean Energy Regulator (CER) expects 2024 to see a record 7.2-7.5GW of new wind and solar capacity (including 3.15GW of new rooftop solar) to be added.

The NEM reported a record high instantaneous renewable energy share of 73.7% in October 2024,¹ and a record high average 47.4% RE penetration in October 2024. Low wholesale prices resulted, averaging just \$69/MWh in September, almost halving the year-to-date 2024 wholesale price average of A\$125/MWh, reminding all of the nexus between high renewables penetration, new capacity supply and sustained lower power prices.

The Australian Energy Market Commission (AEMC) forecasts that the NEM will experience a 13% real decline in retail electricity prices over the coming decade to 2034, driven by lower wholesale electricity costs as new firming renewable energy capacity comes online, as well as lower regulated network costs as the total capital cost is amortised over a higher demand base as we see continued electrification of everything.²

The Federal Opposition is using its nuclear fantasies to largely drown out this developing good news story: more firming capacity, sustained lower prices and decarbonisation.

The Capacity Investment Scheme

The rollout of large-scale onshore wind and solar PV is coming off its LNP driven nadir. The Australian Energy Market Operator (AEMO) notes there are a record 260GW of project proposals in the investor queue but warns that a very clear signal to investors is needed to support sustained and ongoing investment in generation, storage and transmission to ensure that Australian energy consumers continue to have access to reliable energy, to put permanent downward pressure on electricity prices, and to drive decarbonisation.³

A key part of the positive momentum is the Federal Government's Capacity Investment Scheme (CIS) to target 32GW of new firming renewables capacity, turbocharging the electricity sector transition underpinning its 2030 target by underwriting private sector investment in renewables and in dispatchable energy. December 2024 saw 6.4 gigawatts (GW) of new generation and an associated 3.5 gigawatt hours (GWh) of battery energy storage systems (BESS) awarded in the first generation tender, an excellent start.⁴ At 6.6x oversubscribed at over 40GW of proposals,⁵ there is clear investor appetite.

¹ RenewEconomy, [Why is spring the record-smashing season for renewables?](#) 15 October 2024

² Australian Energy Market Commission, [National Trends](#), November 2024

³ [AEMO CEO speech at Australian Energy Week 2024](#), 12 June 2024

⁴ Minister Chris Bowen, [Fixing Australia's energy system now with new cheap, clean, reliable renewables](#), 11 December 2024

⁵ RenewEconomy, Bowen hints at even larger auctions after huge response to Australia's biggest wind and solar tender, 17 July 2024

But we need to move at speed and scale, doubling down on the urgency and delivery we are starting to see as we approach the second half of the decade.

Implications of electricity demand growth

After two decades of no electricity demand growth, FY2024 saw NEM electricity demand growth of +1.6% year-on-year (yoy). With the growing focus on decarbonisation, electrification of everything, including transport – the global shift to electric vehicles (EV) is unstoppable – and combined with the growth in datacentres and AI use and electrification of everything means a progressive growth in electricity demand that makes the need for accelerated investment in new generation, firming, grid transmission, distributed energy resources and a smart two-way flow market critically important.

The declining role of gas and the need for a planned phaseout

Methane gas-powered electricity generation will play a critical but progressively declining support role alongside battery, demand response management (DRM), vehicle-to-grid (V2G), virtual power plants (VPP), interstate grid transmission and pumped-hydro storage (PHS), particularly during winter, to compensate for the intermittency of renewable energy sources, and to enable many multiples of renewables to connect to the grid.

The restrictions on domestic supply of methane gas by multinationals keeps the domestic gas price many multiples of the price applying in other major LNG export nations (e.g. the US and the Middle East), and this underpins the inevitable pivot to BESS accelerating the progressive electrification and fossil gas substitution trends. It is critical that the methane gas phase out is planned nationally, like it is in the ACT and Victoria, rather than left to captured ‘free markets’ with their near total regulatory capture.

The critical role of CER

With ongoing capital cost blowouts and delays in building any major infrastructure project in Australia, including grid transmission, it has never been more imperative that we accelerate the deployment of consumer energy resources (CER) – rooftop solar, behind the meter batteries, EV and V2G, air heat pumps – both in the residential and commercial and industrial (C&I) sectors. AEMO forecasts CER will quadruple to over 100GW by 2050, and this requires a modernisation of time-of-day (ToD) pricing for consumers to encourage behaviour change e.g. incentivising demand when electricity is plentiful, cheap and zero-emissions e.g. whenever it is sunny.

A daily summer solar-soaker tariff for those in energy poverty would build political support for the energy transition, and enhance grid reliability far better than accelerating renewable energy curtailment. AEMO is today as worried about minimum on-grid electricity demand as it is in managing peak demand events. A time-of-day ‘solar-soaker’ pricing signal could solve this far more equitably.

Key Findings

The global energy markets are delivering record installations of renewable energy, despite some temporary headwinds in terms of capital cost inflation as western developed market inflation and hence interest rates increased. Whilst China is leading the world, 2024 will see record renewable energy installs across both China and the US, India, Pakistan and Europe. Assumed constraints of electricity grids to handle high variable renewable energy (VRE) penetration have consistently been proven wrong. The rapid commercialisation of medium duration BESS and batteries-on-wheels (EV) over 2024 further reduces this perceived constraint.

After a prolonged new energy investment drought instigated by the previous government, 2024 has seen a strong uplift in planning approvals, and a major expansion of project proposals across Australian wind, solar and BESS and a major expansion of project proposals moving forward to final investment decisions (FID), construction and commissioning, whilst behind the meter rooftop solar continues to boom. BESS deployments in particular are booming, and the result is that electricity prices are likely to finally see sustained downward pressure, overdue relief from the fossil fuel driven energy price hyperinflation since Putin's Ukraine invasion.

Pumped Hydro Storage (PHS) will play an important role in Australia for seasonal storage and grid reliability, even as the short, and increasingly medium duration storage market is going to be progressively captured by BESS. This public insurance role will make private PHS commercially unbankable absent clear system value government financial underwriting.

Consumer energy resources (CER) – led by rooftop solar, but increasing also including behind the meter batteries, EV, VPP and DRM tools – are coming with the electrification of everything to play a key role in the deliverability of Minister Bowen's 82% by 2030 target.

Reignited climate wars have seen the social licence of grid transmission projects steadily eroded over 2024, undermining Australia's delivery on its ambitious 82% renewables by 2030 target. BESS is providing a massive alternative path to ensuring grid reliability even as we accelerate the deployment of VRE. Batteries on wheels will likewise progressively reduce incumbent fossil fuel industry lobbyist fueled political fears over grid reliability as we accelerate the deployment of these newer technologies at speed and scale.

Relatively expensive offshore wind has become a political football, used by climate deniers to undermine Australia's energy system transformation. Offshore wind will play an important role next decade in delivering on Australia's move beyond 82% renewables by 2030.

2024 has seen strong progress in building the policy and regulatory support for the progressive electrification of everything and decarbonisation of the Australian economy. There have been many incremental steps forward collectively building momentum, despite fossil fuel incumbents and their climate denier stooges' continued noisy interventions.

Significant decarbonisation and electrification progress has been made under the Albanese Federal Government, putting Australia on track for 82% renewables and 43% emissions reduction by 2030. The Capacity Investment Scheme (CIS), Future Made in Australia (FMIA), Vehicle Emissions Standards and Safeguard Mechanism are compounding momentum.

In NSW, failure to maintain momentum after the change of NSW government resulted in the need for taxpayers to extend yet another \$450m coal subsidy to Origin Energy for Eraring, and a prolonged pause in new generation project approvals. However, progress over 2024 has accelerated, and the significant CIS wins have NSW back on track for a much needed accelerating path towards 2030.

The newly elected LNP government in QLD, our most emissions intensive state, has confirmed its commitment to cut emissions by 75% by 2035. With six coal power stations, it will be key in Australia's coal power closure pathway, and it has opposed nuclear, differentiating from its Federal counterparts. It is replacing the Pioneer-Burdekin mega PHS project with distributed, smaller, faster to build alternatives less prone to cost blowouts.

South Australia is a leader in renewable energy nationally and globally, with an average share of 72% renewables in the last 12 months, putting the state on track for 100% VRE penetration before 2027. However the recent proposal for a new capacity payment scheme including existing and new fossil fuel generation is a regressive step.

In WA, the historical fossil fuel heartlands of Collie and Kwinana are being transformed by mega BESS projects, as even Hancock Prospecting pivots to solar to power iron ore processing and the state energy minister signals the need for increased urgency in firming renewables approvals processes. Strong legislated WA emissions reduction targets are overdue.

The long known approaching end of life of Australia's high emissions, increasingly unreliable coal plant clunkers necessitates an accelerated and scaled deployment of replacement capacity, a process that should have commenced several years ago. Almost all Australian coal clunkers will close in the next decade or so, and grid reliability will continue to be undermined by planned and unplanned coal plant outages, particularly during periods of high demand resulting from high temperatures.

The unreliability of end of life coal fired power plants and threat to the NEM is increasingly problematic for AEMO. The good news is that the massive scaling up of BESS is providing the firming the grid needs to deliver reliability, as well as affordability, both in times of peak and minimum on-grid demand.

Climate luddites and fossil fuel lobbyists will continue to push methane gas as a "bridging fuel" for decades to come. However, the rapid ongoing scaling up of BESS deployments, underpinned by ongoing BESS deflation, continues to erode the commercial viability of methane gas peakers, particularly in Australia where the gas cartel ensures we have some of the world's highest domestic gas prices. AEMO needs to stop taking fossil fuel funding and focus on serving the national interests of Australia.

With the rapid pivot to EVs and BESS, and development of AI and data centres, Australian electricity demand is likely to increase ~1% pa over the coming decade, after two decades of flat electricity demand, totally decoupled from real GDP growth. Caution is required on overestimating demand growth, as this creates increased fear and regulatory responses of grid gold-plating, increasing costs. Instead, measures to incentivise grid T&D owners to invest in ongoing energy efficiency gains and existing grid optimisations to largely offset demand growth should be prioritised.

Key Recommendations

CAPACITY INVESTMENT SCHEME

- The Federal Government should respond to the market momentum and investor appetite demonstrated in the 6.6 times oversubscribed round 1 of the CIS tender, and confirm its decision to upscale the next round from 6GW to 10GW, to expedite and accelerate energy market transition in line with the 2030 target.

SPEEDING CLEAN ENERGY INFRASTRUCTURE APPROVALS

- The Federal and State governments should embed Overriding Public Interest as a key consideration in approvals processes for utility-scale renewables, storage and transmission to expedite firmed clean energy infrastructure and help ensure rollout is accelerated in line with delivery of our electricity sector decarbonisation targets.
- A strong central Director General of Decarbonisation is needed Federally to bridge the siloed Minister and Departmental focus, reinforced by multiple state owned enterprises (SOE) spanning NRF, CEFC, ARENA, NAIF, EFA, NZEA, CCA and the Future Fund, plus the CSIRO, AEMO, AEMC, AER and Clean Energy Regulator: a true alphabet soup! Good luck to the Tim Nelson chaired committee, this review is overdue!

CER

Federal government

- As a national energy transformation priority in MYEFO and the 2025-26 Budget, significantly boosted budget investment into CER given sustained cost of living pressures exacerbated by high energy bills. This is urgent given the absence of any additional stimulus to CER including household electrification in the Federal Budget 2024-25, and only \$28m of new funding to better integrate consumer energy resources into the grid. CER supports the call by Renew Australia for All (RAFA) for \$5bn pa Federal Government financial support for accelerating CER, emphasising the need for programs to ensure all Australians to benefit.
- Incentivise household electrification by expanding CEFC financing to a range of lending organisations to provide discounted finance to build or buy homes with high energy efficiency ratings and support energy-efficient equipment and rooftop solar systems, leveraging and de-risking the balance sheet climate exposure of our banks.
- Support appliance replacement by direct support, e.g. tax write offs and/or direct subsidies (leveraging existing state programs), to enable all consumers to shift to the electric versions of fossil gas appliances, e.g. heat pump hot water heaters, heat pump space heaters, reverse cycle air conditioners, electric cooking; and to power those appliances via rooftop solar and storage in household and community batteries supported by cheap, accessible finance and government guarantees for loans.
- Prioritise evaluation and further rollout of the Thirroul 2515 pilot which provides income tested financial support of up to \$10,000 for households to convert gas appliances to electric and purchase home batteries.
- Establish a 10 year interest free loan program for rooftop solar and household and C&I batteries, with A\$1,000m pa nationally for loans repaid one-tenth each year – with the scheme going for a decade. This provides a A\$8bn interest subsidy over the

full 20 year life of the project, with the immediate impact of significantly contributing to the delivery on the 82% renewables target without having to wait for the interstate grid transmission projects to be built.

- Lift the Small-scale Renewable Energy Scheme (SRES) cap from 100kW to 1,000kW immediately to accelerate C&I deployments. CER can deliver half of the new generation capacity needed at speed and scale, with no grid delays.⁶
- As Nexa Advisory argues, task DCCEEW and the AEMC with addressing bias towards building more poles and wires in the regulatory framework for electricity networks, instead incentivising Distributed Network Service Providers to explore non-network solutions as an alternative; incentivise grid T&D owners to invest in ongoing energy efficiency gains and existing grid optimisations and clearly define the roles and responsibilities related to CER of all key industry bodies (AEMC, AEMO, AER and the Clean Energy Regulator) to ensure coordination and regulatory clarity as a foundation for accelerating distributed firming renewables. This will offset AI and EV related demand growth, avoiding grid gold-plating and the resulting costs to consumers.
- Modernise time of day pricing for consumers by putting in place a four-hours free daily summer solar-soaker tariff for all those in energy poverty and social housing building political support for the energy transition, enhancing grid reliability far better than accelerating renewable energy curtailment, and solving the imperative for minimum on-grid electricity demand equitably.

States

- Commit to comprehensive, funded state CER strategies with hard targets for rooftop solar, batteries and other CER (as [NSW](#) has done), reflecting and complementing the Federal CER Roadmap.

INCENTIVISING INVESTMENT

- Accelerate domestic private investment into clean energy by reforming the Your Future Your Super rules to mobilise the [\\$3.9tn of capital](#) in Australia's super pool. The YFYS performance testing regime inhibits and restricts superfunds' ability to invest in Australian renewables and infrastructure projects, which often have longer investment return timelines. Given the long-term nature of superannuation, the government should make benchmarks prioritise future-facing industries and low- and zero-carbon investments, including electricity market transformation projects.⁷
- Incentivise foreign capital investment into Australian clean energy including from private Chinese corporates by reforming the opaque Foreign Investment Review Board rules to ensure clarity and a welcoming investment environment. CEF's research shows that China's world leading cleantech firms have collectively committed [\\$120bn of outbound cleantech investment](#) around the world since 2023, supporting clean energy manufacturing and projects, but Australia's current foreign investment regime is undermining this here.

⁶ CEF, [The Lights Will Stay On: NSW Electricity Plan 2023-2030](#), 18 July 2023

⁷ Climate Capital Forum, [Pre-Budget Submission 2024-25](#), January 2024

FOSSIL FUEL TAX REFORM TO SUPPORT ELECTRICITY SECTOR TRANSITION

Federally

- The Federal government should reform the still failing gas royalty Petroleum Resources Rent Tax (PRRT), ensuring that multinational gas corporates operating here return a reasonable dividend to the people for profiteering from our sovereign assets. Deductions should be reduced to 80% of assessable income. Inaction on the PRRT continues to impose a huge opportunity cost, constraining the government's capacity to fund critically urgent electricity market transition programs, including the scaling up of the CIS and accelerating the rollout of CER rebates.
- Cap the diesel fuel subsidy at \$50m per group annually and reinvest 100% of the proceeds via a Transition Tax Credit to incentivise investment in mine electrification and decarbonisation, turning a headwind to decarbonisation into a tailwind.

States

- NSW should build on its September 2023 uplift to coal royalties to ensure a fairer return to the people from coal superprofits by implementing a progressive royalties regime to generate funds for re-investment into energy transition. Queensland's progressive coal royalty scheme (from 7-40% of revenues depending on coal prices), has delivered a >\$10bn pa bonanza to the state, providing a revenue boost funding the state's ambitious rollout of critical [firmed clean energy infrastructure](#).

EMISSIONS AND RENEWABLES TARGETS

Federally

- Increase the ambition of the national 43% by 2030 emissions reduction target by locking in a target of $\geq 75\%$ by 2035 – especially in light of Australia's bid to host COP31 in 2026 – signalling policy certainty on our national decarbonisation trajectory to investors and providing the legislated foundation for an accelerated energy market transition to firmed renewables.

States

- Commit to credible renewable energy targets to 2030/35 aligned with and enabling the national electricity market decarbonisation goals represented in the Federal Government's ambitious 82% by 2030 pledge. At present NSW lacks a 2035 renewables target; it should aspire to QLD's 95% by 2035 target and at the very least match Victoria's 80% by 2035. Western Australia is the biggest laggard with no emissions reduction or renewables targets. We support the [SEC's call](#) for at least 82% renewable energy by 2030 on the South-West Interconnected System (SWIS) and at least a 43% emissions reduction by 2035.

COAL PLANT CLOSURES

States

- Reaffirm their commitments to existing coal power plant closure schedule dates and formalise these in their state climate and energy strategies.
- Rule out subsidies to private coal operators to further extend end-of-life plants.

Federally

- Require formal commitment to scheduled coal-fired power retirements as part of state-federal [Renewable Energy Transformation Agreements](#) to help ensure an orderly transition including clarity for planning and implementation of replacement capacity on the timeframe and scale required.

NUCLEAR

States

- Reaffirm that state legislative bans on nuclear will remain in place until the economics of nuclear are substantiated with credible studies rather than flights of fantasy and can be done without creating sovereign risk and destabilising the critically important investment plans underway this decade.

Federally

- Expedite the delivery of the report of the federal Commission of Inquiry into Nuclear Energy well ahead of the 2025 Federal election to affirm and restore investor confidence in the Federal commitment to an accelerated transition to firmed renewables as the solution to Australia's economy-wide decarbonisation; and to ensure public confidence in informed, objective analysis of the issues around a nuclear energy industry in Australia in the lead up to the election.

FEDERAL DECARBONISATION PLAN FOR ELECTRICITY AND ENERGY

- The Federal Government should prioritise development and release of its [Sector Decarbonisation Plan for Electricity and Energy](#), consultations on which closed in April, eight months ago at the time of writing. This plan should be a national strategic priority to underpin further acceleration of renewables deployment momentum supporting achievement of the government's 82% renewables by 2030 goal.

Section 1. Accelerating Renewable Energy Uptake: Global Context

The global energy markets are delivering record installations of VRE, despite some temporary headwinds in terms of capital cost inflation as western developed market inflation and hence interest rates increased. Whilst China leads the world in VRE, 2024 will see record renewable energy installs across China, the US, India and Europe. Assumed constraints of electricity grids to handle high VRE penetration have consistently been proven wrong. The rapid commercialisation of medium duration BESS and batteries-on-wheels (EV) over 2024 further reduces this perceived constraint.

The International Energy Agency's (IEA) new Renewables 2024 report confirms that while the world has seen a strong uplift in collective investment in renewable energy deployments since the December 2023 COP28 pledge at the UN Climate Change Conference to treble installed renewables capacity by 2030, we are not yet on track collectively to meet this goal, with the agency forecasting that global renewable capacity is expected to grow by 2.7 times to the end of this decade – led by China, individually responsible for a staggering 60% of the global IEA upgrade forecast.⁸

In the positive, this is a 25% lift in collective ambition relative to less than a year ago, reflective of the significant deflation evident in both solar and battery firming costs, and ongoing rapid technology improvements. This strongly supports a global ratcheting up of ambition collectively in nations' updated emissions reduction targets under the Paris Agreement due in 2025.

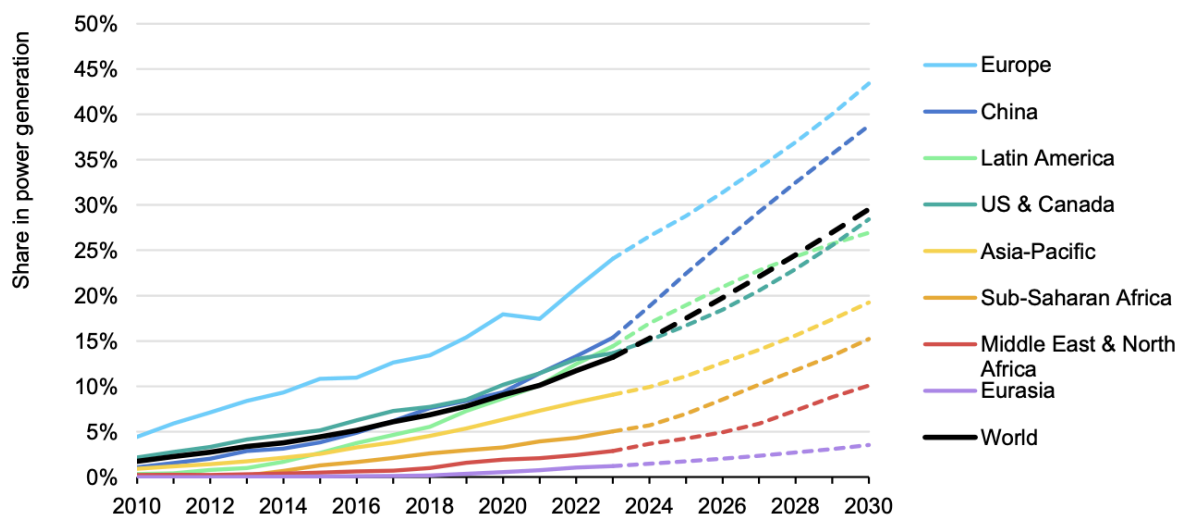
Thanks largely to China, we now have the global cleantech manufacturing capacity to accelerate deployments of renewables significantly and strive to achieve the trebling goal. The massive deflation of prices for renewables technologies and the drive for energy security and independence both increasingly favour accelerating investment into renewables as the world looks to mitigate the escalating crisis of climate change, but we need to collectively go faster.

The IEA now models a continued increase in global renewables deployments to 940GW annually by 2030, a 70% increase in the record of 2023. This shows a global 'bending of the curve', very overdue in light of the climate science, but a deployment rate considered impossible only a few years ago.

The IEA forecasts Australia will add 53GW of renewable capacity between 2024-2030, to reach a 50% VRE share of generation by 2030 (58% including hydro), up from 28% in 2023. This is well below the 82% RE target of the Federal Government, even as this is the highest VRE penetration in the world – Figure 1.1, more than double Vietnam or India, and ahead of China at almost 40% and the EU at 44%, supported by its massive international grid connectivity. Of the largest economies in the world, the UK is forecast by the IEA to reach 65% VRE share by 2030, Chile 60% and Germany 70%. What is clearly staggering is the global doubling between 2024 and 2030 from 15% average to 30%, something most energy practitioners said would be impossible only a few years ago.

⁸ IEA, [Renewables 2024](#), October 2024

Figure 1.1: Projected VRE Share of Generation by Region, 2010-2030

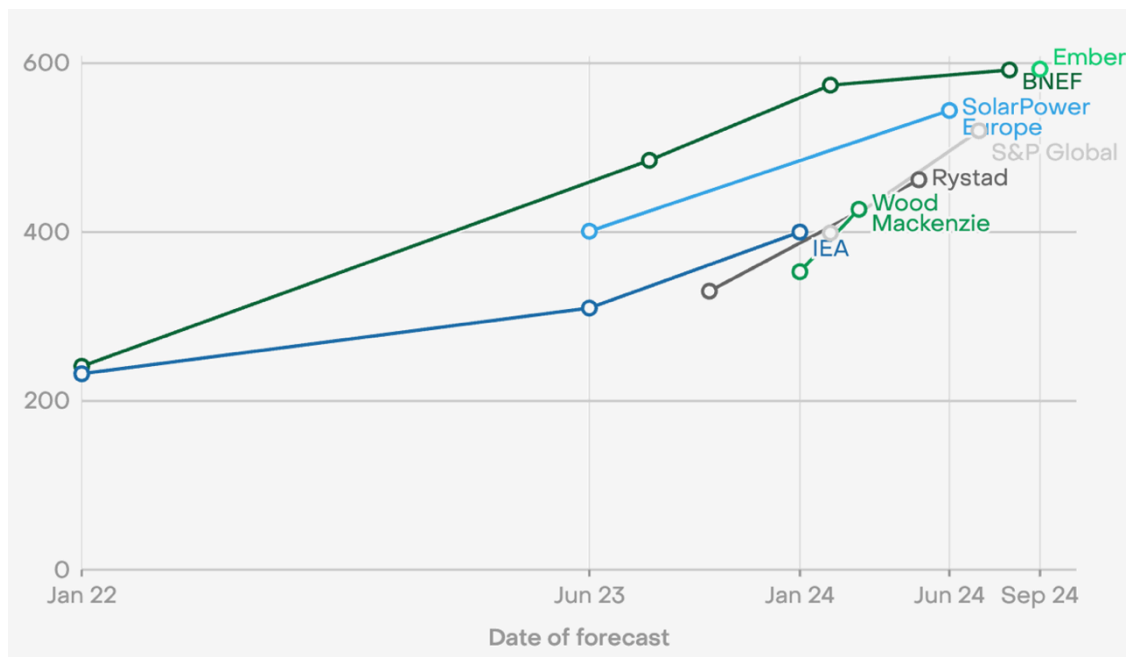


Source: IEA Renewables 2024

Considering existing policies and market conditions, the IEA’s main case sees 5,500GW of new renewable capacity becoming operational by 2030. This implies that global renewable capacity additions will continue to increase every year, reaching 940 GW annually by 2030 – 70% more than the record level achieved last year. Solar PV and wind together account for 95% of all renewable capacity growth through the end of this decade due their growing economic attractiveness in almost all countries.

Figure 1.2 shows the continuing ratcheting up of global solar installation forecasts for 2024 over the last few years.⁹ CEF expects this trend to continue out to 2030.

Figure 1.2: Projected Global Solar Capacity Installs for 2024, by Date of Forecast (GW)

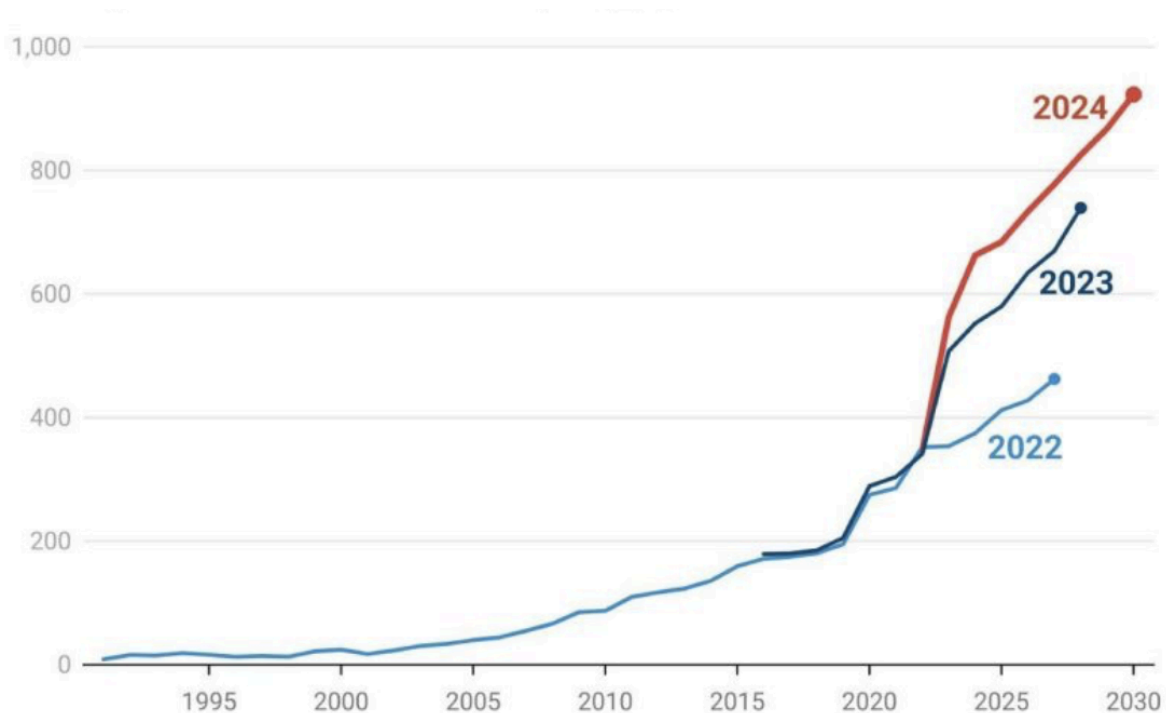


Source: Ember

⁹ Vox, [Even solar energy’s biggest fans are underestimating it](#), 20 September 2024

Figure 1.3 shows the continuing ratcheting up of IEA global solar installation forecasts out to 2030 over the last three years.

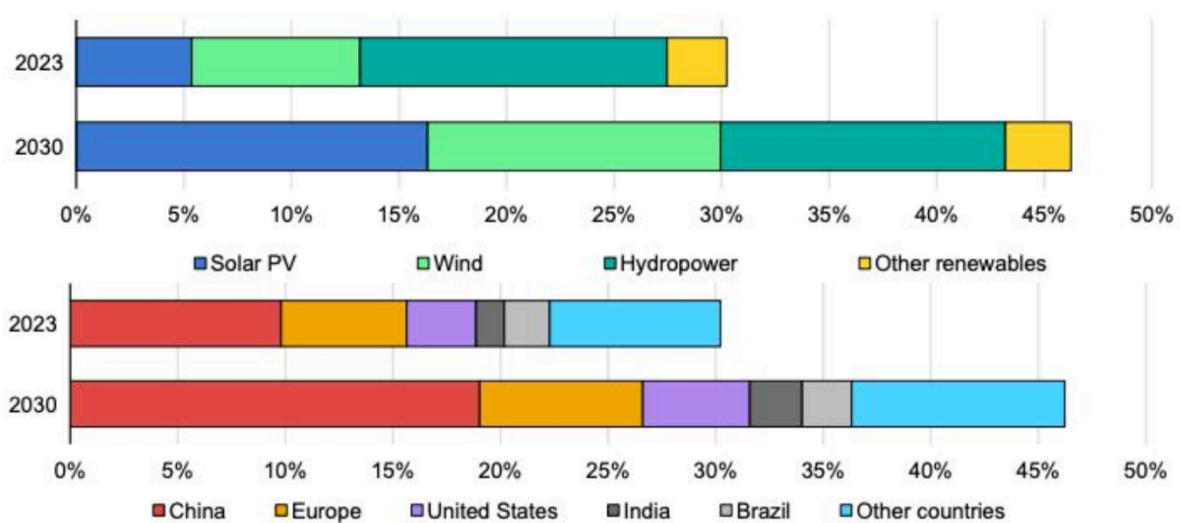
Figure 1.3: IEA Projected Annual Global Solar Capacity Installs to 2030 (GW)



Source: CarbonBrief, using IEA Renewables reports 2022, 2023 and 2024

Figure 1.4 shows the IEA’s estimate to 2030 that renewable electricity will represent 46% of global generation total, up from 30% in 2023, led by China.¹⁰ Australia’s 38% in 2023, and target of 82% by 2030, is well ahead of the global average, more so by 2030.

Figure 1.4: IEA Projected Global Electricity Generation by Renewable Energy Technology, and by Country/region, main case, 2023 and 2030



Source: [IEA Renewables 2024](#)

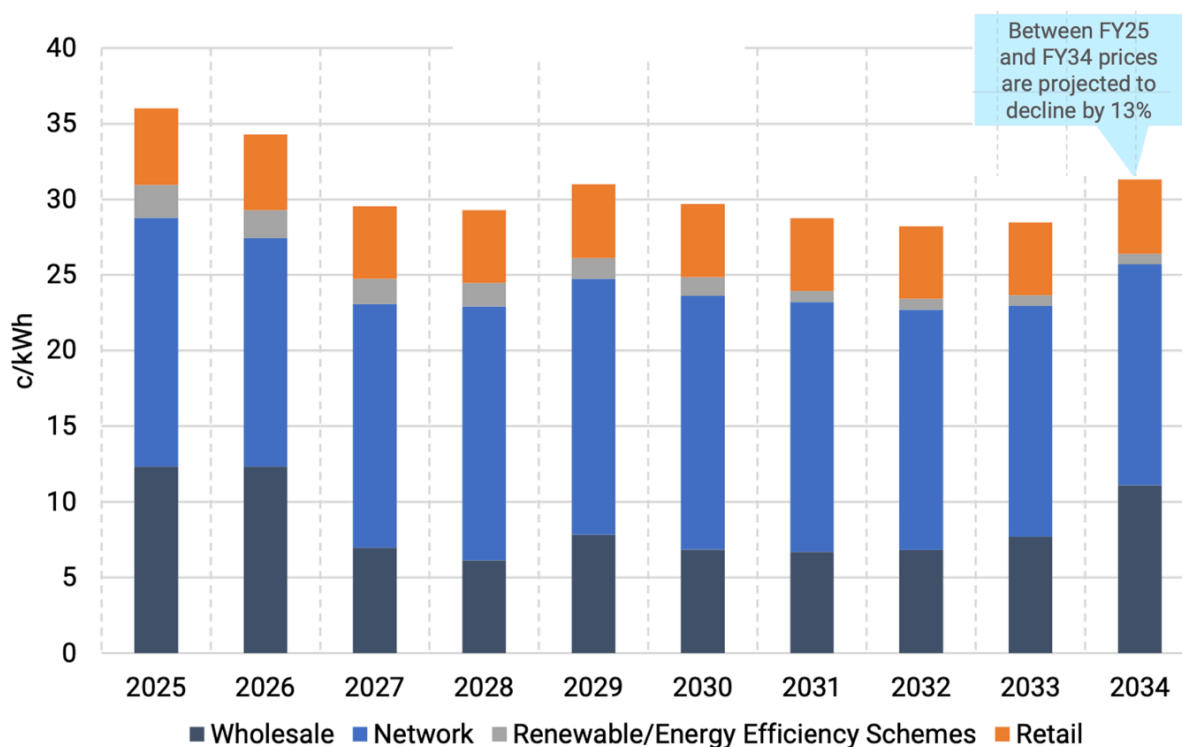
¹⁰ IEA, [Renewables 2024](#)

Section 2. Building Australian Renewable Momentum

After a prolonged new energy investment drought instigated by the previous government, 2024 has seen a strong uplift in planning approvals, and a major expansion of project proposals across Australian wind, solar and BESS, whilst behind the meter rooftop solar continues to boom. BESS deployments in particular are booming, and the result is that electricity prices are likely to finally see sustained downward pressure, providing overdue relief from the fossil fuel driven energy price hyperinflation since Putin’s Ukraine invasion.

November 2024 saw the AEMC forecast that the NEM will experience a 13% real decline in retail electricity prices over the coming decade to FY2034, driven by lower wholesale electricity costs as new firming renewable energy capacity comes online, as well as lower regulated network costs as the total capital cost is amortised over a higher demand base as we see continued electrification of everything – Figure 2.1.¹¹ The AEMC also highlights that the biggest price rises to electricity consumers will come from wind and transmission connection delays, and sub-optimal rollout of CER orchestration. Long term interest rates are a third key variable, and that could raise or lower total costs materially depending upon changing inflation expectations.

Figure 2.1: Average Residential Electricity Price Outlook, Real prices \$FY25 to 2034



Source: Australian Energy Market Commission, November 2024

¹¹ Australian Energy Market Commission, [National Trends](#), November 2024

The AEMC also detailed their analysis showing conclusions entirely aligned with Rewiring Australia. If an Australian household is able to take advantage of all four electrification actions today, they could reduce their energy expenditure by more than 70% – from \$5,000 to under \$1,500 a year – Figure 2.2.¹² This reflects four key steps:

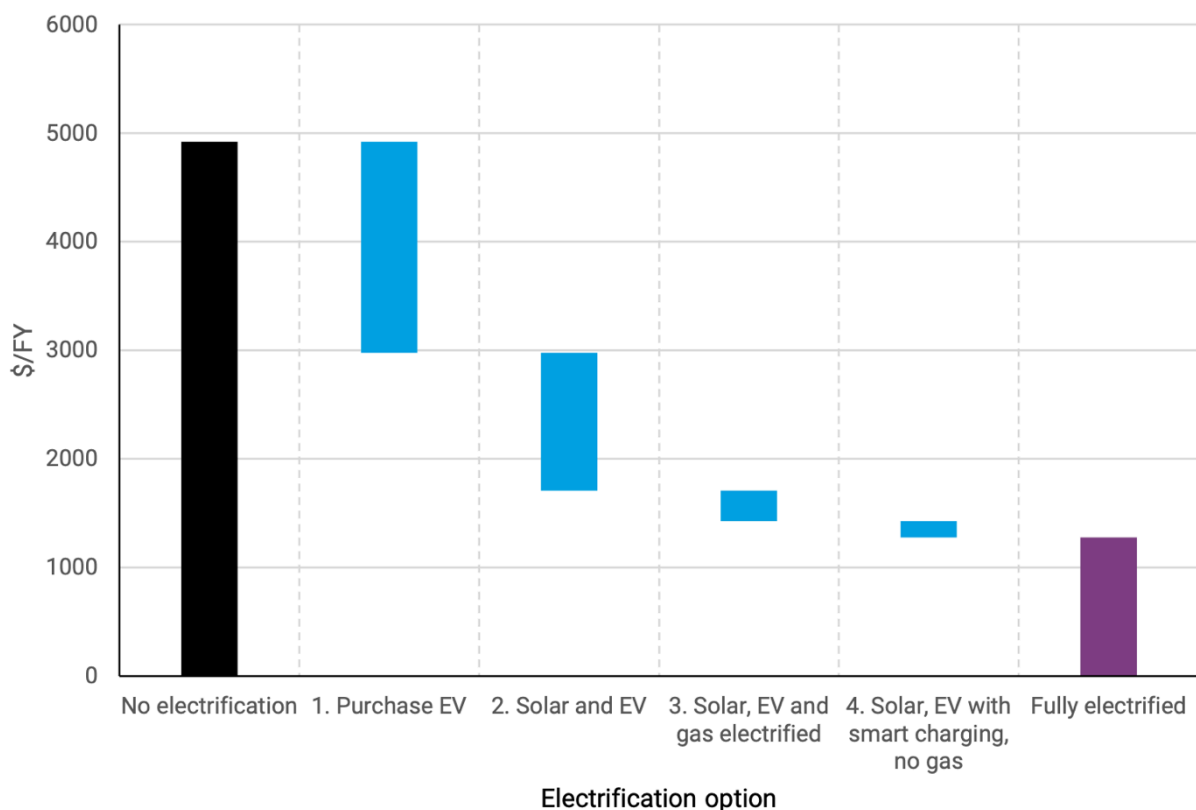
1. Purchases an EV;
2. Install rooftop solar;
3. Switches methane gas appliances to electric ones; and
4. Charges EVs during the day when electricity is cheaper.

Anna Collyer, AEMC Chair, said the agency’s modelling work showed Australian households stood to benefit from electrification, but “we need to ensure this transition is well-managed and equitable, so that the benefits are accessible to all households, not just those who can access new technology immediately.”

CEF recommends the Australian and State Governments align to implement this progressively across all households nationally over the coming decade, ensuring all Australians are enabled to benefit, a key recommendation of the Renew Australia For All collaboration of social organisations. This will best educate the Australian electorate of the value of embracing the energy system transformation in alignment with the climate science.

Figure 2.2: AEMC’s Estimated typical energy cost savings if a household electrifies

A Household with annual electricity consumption of 3,900kWh, real \$, FY2025



Source: Australian Energy Market Commission, November 2024

¹² RenewEconomy, [Australian homes could slash energy bills by two thirds by cutting out gas and petrol. AEMC says](#), 29 November 2024

A Sustained Accelerated in Project Evaluation and Approvals Is Key

CEF advocates that the Australian and State governments accelerate the evaluation and approval of new energy infrastructure projects. The CIS has really tried to incorporate qualitative and quantitative assessment of regional and First Nations benefits, and grid access optimisation, and hopefully will include a bias to improve local content requirement. CEF advocates for Australia to consider the new EU Overriding Public Benefit framework,¹³ recognising the critical benefit to all Australians from accelerating the supply of low cost zero emissions energy infrastructure at the speed and scale the climate science dictates, and in order to permanently lower Australia's energy prices.

December 2024 saw BHP Australia President Geraldine Slattery focus on this,¹⁴ highlighting the 2020 Samuel Review that found on average, complex resource-sector projects can take over 1000 days to assess and approve. And highlighting that the US introduced an Energy Permitting Reform Act in 2024.¹⁵ Canada has created a Federal Permitting Coordinator and amended its Impact Assessment Act to accelerate decisions.¹⁶ And that in Chile, the need for a better permitting system is now recognised across the Congress, and the Government has made it a focus of its legislative agenda. The NSW Minns government has made a concerted effort over 2024 to improve the congestion and roadblocks in the NSW Planning Department, following the Victorian government's commitment to faster approvals for renewable energy projects in March 2024,¹⁷ and efforts by the WA State Government as well to inject urgency to the approvals process.¹⁸ CEF hopes we will see more concerted efforts to accelerate the deployment of infrastructure solutions at the speed and scale the climate science and energy cost of living crisis dictates is needed. It was good to see the NSW release in November 2024 its New Planning Framework to support clean energy deployments.¹⁹ Given the ongoing gouging of Australian consumers by the fossil fuel industry, driving a 16% increase in electricity prices and a 12% increase in gas prices over FY2024,²⁰ the obvious solution is to flood the market with new firming renewable energy supply to permanently reduce energy costs in Australia.

¹³ EU, [Accelerating the deployment of renewable energy](#)

¹⁴ BHP Speech, [Geraldine Slattery at Melbourne Mining Club](#), 5 December 2024

¹⁵ US Congressional Research Service, [Energy Permitting Reform Act of 2024: Electricity Provisions](#), October 4, 2024

¹⁶ Canadian Government, [Permitting Coordination for Clean Growth Projects](#),

¹⁷ Premier of Victoria, [Faster Approvals For More Jobs And Lower Power Prices](#), 14 March 2024

¹⁸ Boiling Cold, [Whitby lauds new blood to speed WA environmental approvals](#), 6 December 2024

¹⁹ NSW Planning, [New Planning Framework to support NSW's clean energy future](#), 12 Nov 2024

²⁰ AFR, [Household hardship mounts as energy prices increase](#), 3 December 2024

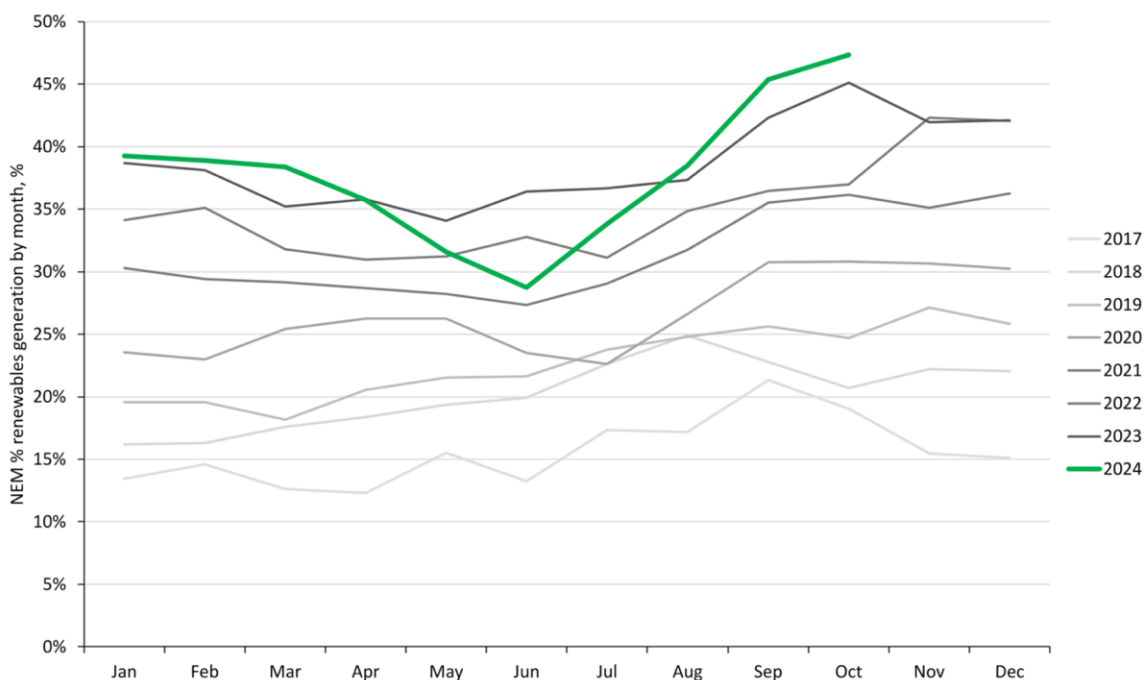
The Australian government has set an ambitious target of 82% renewables share by 2030, and in December 2023 Australia signed on to the tripling renewables pledge at COP.²¹

We are already building momentum for a stronger share beyond this with the ongoing progress towards offshore wind development plans in Victoria, NSW and West Australia. AEMO reports an exceptionally large investor queue: as at April 2024, there were 11GW committed, 9GW anticipated and 280GW proposed new projects, relative to an existing 65GW of generation capacity.

An August 2024 study by Regional Australia Institute estimates that renewable energy projects are likely to create over 20,000 jobs across Australia by 2030, including 6,400 direct jobs, 7,600 additional jobs in industries like transport and manufacturing, and another 5,700 jobs from regional flow on opportunities.²²

October 2024 saw Rystad estimate there is over 7 GW of utility solar and wind at various stages of construction and commissioning, which once commissioned will add 17 TWh/year of renewables generation. Rystad estimates there is over 5 GW of utility batteries at various stages of construction and commissioning which will time shift more renewables load. Rystad analysis shows that for the NEM, October 2024 was the highest month of renewables (rooftop solar, utility solar, wind, hydro, biomass) generation on record, reaching 8.13TWh (47.6% renewables), with new records set in Victoria (2.03TWh) and Queensland (1.89TWh). October was the first time NEM renewables exceeded 8 TWh in a month – Figure 2.3.

Figure 2.3: NEM % Renewables Generation by Year and Month, 2017-2024



Source: [Rystad Energy Research, November 2024](#)

30 October 2024 was a new record high NEM instantaneous renewables penetration of 74.7% share for a 30 minute interval. And South Australia registered a new renewable

²¹ RenewEconomy, [Australia signs up to COP pledge to triple renewables by 2030, double efficiency](#), 3 December 2023

²² Regional Australia Institute, [Community support for renewables isn't bought, it's earned: 20,000 jobs at stake](#), 15 August 2024

energy share high of 85.2% average for the entire month of October 2024- given no hydro, this is probably close to a sub-national world record for variable renewable energy penetration.²³

November 2024 saw a renewable energy share over the month of 44.6%, up from 40.2% a year ago, and only marginally below the 2024 monthly record high of 47.4% delivered in October 2024.²⁴

October 2024 saw Federal Energy and Climate Minister Chris Bowen propose to upscale the next generation tender of the CIS from 6GW to 10GW of wind, solar and BESS, taking advantage of the very significant >40GW of proposals tendered in. CEF applauds this move, given we need to rapidly scale up and accelerate new project delivery to deliver on the government's ambitious 82% renewables by 2030 target.²⁵

October 2024 also saw AEMO Services launch its new Tender #3 inviting bids for clean dispatchable capacity projects across the NEM, with an indicative target of 4GW of 4-hour equivalent dispatchable capacity, or 16GWh.²⁶

October 2024 saw the output of rooftop solar in South Australia reached a new instantaneous peak of 1,747MW, more than 50MW above its previous record set earlier in the month. Rooftop solar is particularly interesting in South Australia, which already leads the country and the world with a record share of more than 72% wind and solar over the last 12 months, 82% in the last 30 days and 93% in the last seven days. At times, rooftop solar has produced enough electricity to meet all the state's demand, and has supplied 21% of all demand over the last 12 months, meaning its been around 50% in the daytime. The start of October 2024 also saw rooftop solar hit a record market share across the whole grid of 49.3%, and the combined output of wind and solar (both rooftop and large scale) also hit a record peak of 73.4%.²⁷

Australia is adding more than 5,000 rooftop solar systems per week, and behind the meter battery installs are set to step up considerably, providing the obvious solution to alleviate the growing curtailment of solar generation.

November 2024 saw the Clean Energy Council (CEC) analysis confirm that progress seen in 3QCY2024 was almost on-track with Minister Chris Bowen's ambitious 82% renewables by 2030 target, a significant step up in annual utility scale deployments relative to previous years. 1,400MW of new large-scale renewable energy generation projects, worth \$3.3bn in new investment, were committed in 3QCY2024, putting Australia on track to reach almost 48% renewable share by the end of 2025.²⁸ An additional highlight of the new investment CEC data is the rebound from onshore wind projects, with 1,758MW of new capacity

²³ RenewEconomy, [More records tumble as renewables hit new high and coal a new low](#), 1 November 2024

²⁴ RenewEconomy, [Solar and wind deliver November generation high, closing out a record spring](#), 3 December 2024

²⁵ RenewEconomy, [Bowen says next round of CIS tenders will seek 10 gigawatts of wind, solar and battery storage](#), 21 October 2024

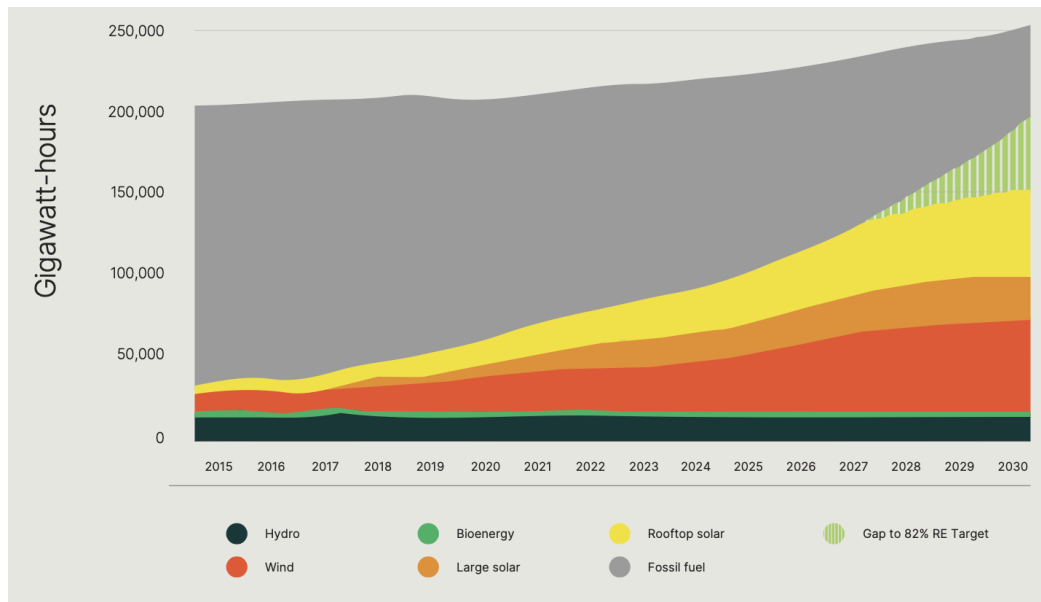
²⁶ Australian Government, [Capacity Investment Scheme: Market brief on Capacity Investment Scheme Tender 3: National Electricity Market – Dispatchable Capacity](#), October 2024

²⁷ RenewEconomy, [Rooftop solar output records tumble again in southern states](#), 9 October 2024

²⁸ Clean Energy Council, [Emissions reductions delivered by renewable energy: 2015 to 2025](#), 19 November 2024

committed in 2024 to date.²⁹ The CEC warns there remains a gap to deliver on the Federal Government’s 82% renewables by 2030 target – Figure 2.4. Full deployment of the CIS 32GW target at speed and scale will close most of this.

Figure 2.4: Actual and Projected Generation Mix – 2015-2030 (NEM & SWIS combined)



Source: CEC Report - Emissions reductions delivered by renewable energy 2015 to 2025, December 2024

November 2024 saw ITK Renewables estimate 7.2GW of new BESS under construction and commissioning across the NEM, a fivefold expansion vs the current 1.8GW operational.³⁰ And a lot more with the whole of Australia is counted, given the massive Collie and Kwinana BESS projects under development.

November 2024 also saw the Climate Change Authority Annual Progress report Australia is now on track for a 43% emissions reduction by 2030, but also called to the government to “strengthen, broaden, lengthen and embed” the CIS to not just close the gap to the 2030 renewables target. The CCA also called for the appointment of an “Energy Transition Coordinator” to drive and monitor the pace and scale of the transition, and for the government to extend the CIS to underpin an ambitious overall emissions reduction for 2035, and prioritise renewable projects that aren’t reliant on grid transmission extensions.³¹ This could leverage the newly appointed review committee chaired by Tim Nelson.

November 2024 saw Oxford Economics Australia report measured electricity construction activity at a record high of \$19.2bn over FY2024, and with an expected investment of \$5bn pa to FY2030. This annual \$5bn investment to decarbonise grid infrastructure is almost 80% higher than the \$2.8bn per annum over the six years up to FY2024. Solar sector construction activity – Figure 2.5 - is forecast to accelerate across Australia. This is supported by strong growth in BESS investment, forecast to grow from \$2.6bn in FY2024 to \$4.6bn in FY25, five times its FY2023 level of \$912m.³²

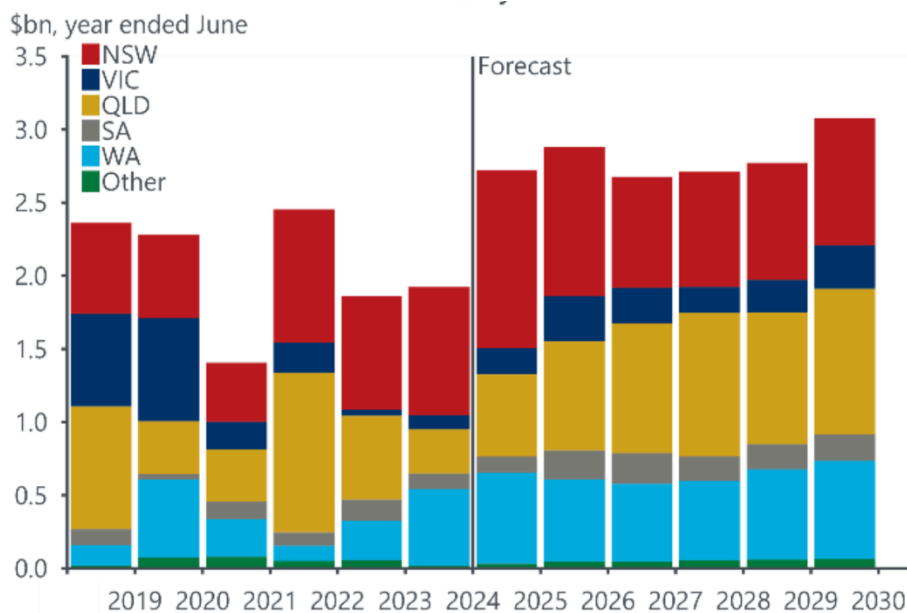
²⁹ Clean Energy Council, [Renewable projects quarterly report 3Q2024](#), 11 November 2024

³⁰ RenewEconomy, [We need lots of wind as well as batteries to move peak prices lower](#), 1 November 2024

³¹ Climate Change Authority, [2024 Annual Progress Report](#), 28 November 2024

³² PV Magazine, [Future multi-billion dollar transmission upgrades to boost Queensland’s grid-scale solar](#), 22 November 2024

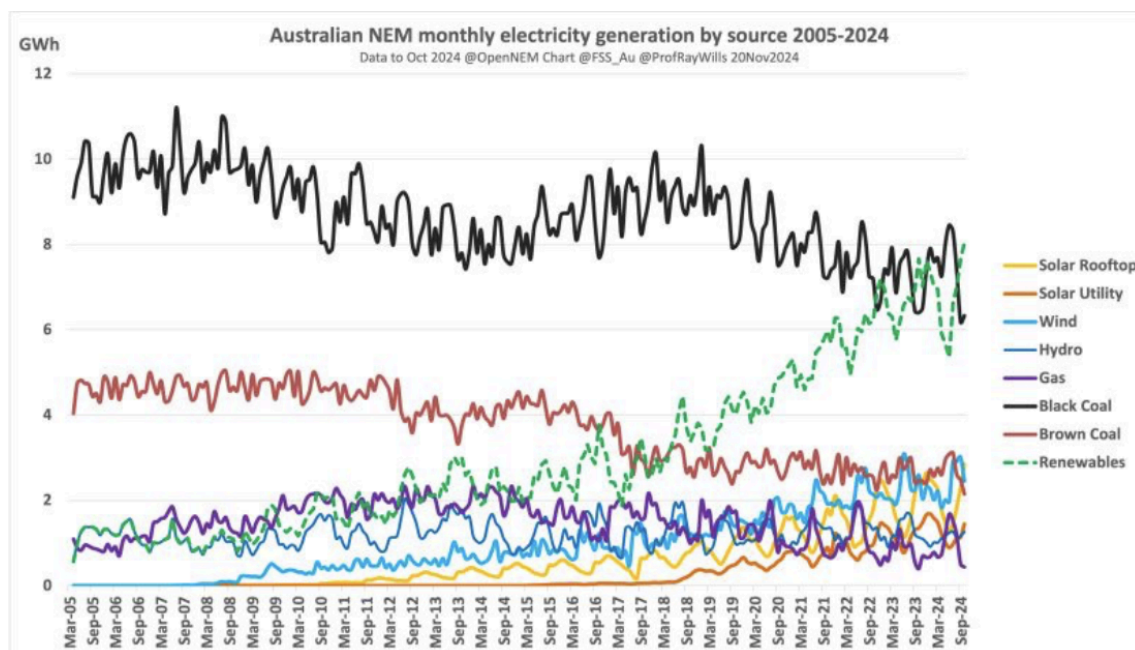
Figure 2.5: Solar Construction Work, By State, FY2019-FY2030



Source: Australian Bureau of Statistics, Oxford Economics Australia

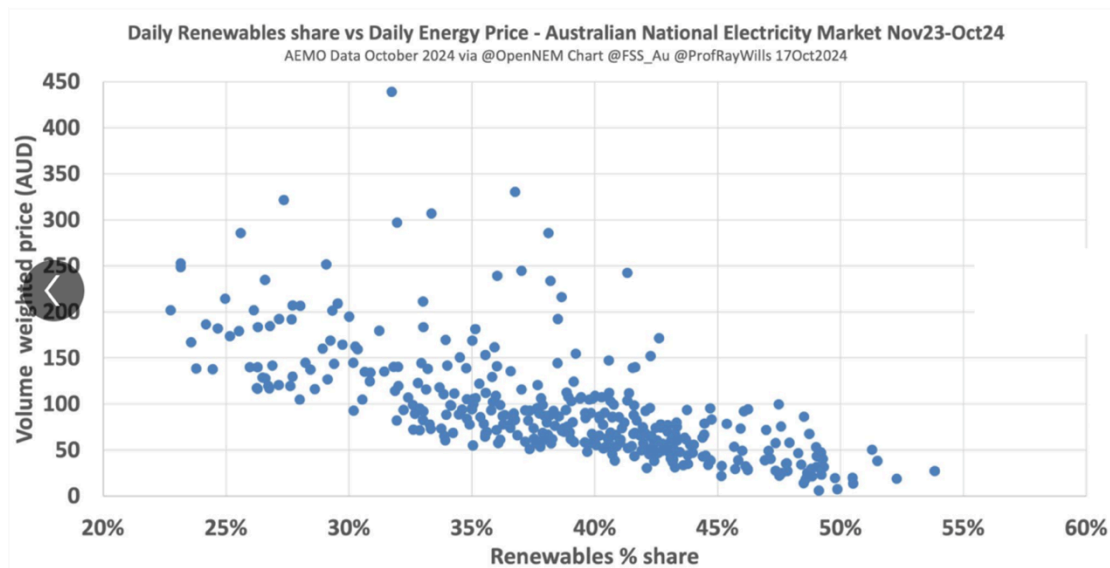
As Professor Ray Wills notes, we are in a climate crisis, where the most vulnerable bear the most costs of externalised carbon pollution. Minister Chris Bowen’s 82% Renewable Energy by 2030 target is entirely doable. For all the talk by vested interests and their paid mercenaries at places like AEMO, methane gas generation holed a total NEM share of 4.9%. An important source of grid reliability, by a small and consistently declining share. October 2024 saw coal generation down to a still very important, but progressively fading 49.8% share. Renewable energy generation contributed a 47.4% share – Figure 2.6 - even as it yielded the lowest wholesale price – Figure 2.7.

Figure 2.6: NEM share of Generation by Fuel Source, 2005-2024 Monthly



Source: Open Electricity via Professor Ray Wills

Figure 2.7: Higher Renewable Energy Share Sees Lower Prices, NEM, Year to October 2024

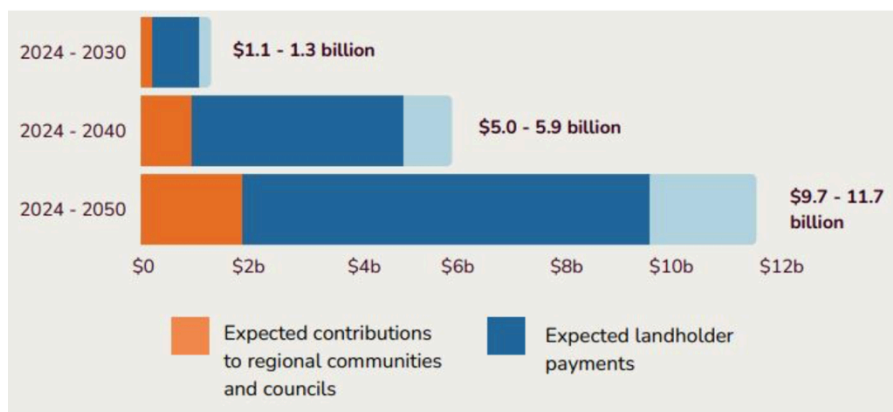


Source: Professor Ray Wills

November 2024 saw new analysis by Regional Australia Institute for Farmers for Climate Action and the Clean Energy Council show that large-scale solar and winds projects across the NEM are expected to deliver between \$0.9-1.1bn in landholder payments in the coming five years. Those direct payments are forecast to increase to between \$7.7-9.7bn by 2050, and an additional \$1.9bn contributions to regional communities and councils – Figure 2.8.³³

Annual payments to landholders typically range from \$5500-6500 per MW and modern turbines typically have 7MW of capacity. Annual payments to landholders are commonly calculated on a per hectare basis, at a rate of \$750-1250 per hectare (ha). One MW of solar panels will typically occupy 2ha of land resulting in a rate of \$1500-2500 per MW. For comparison, a beef farm in high rainfall country might produce \$1500/ha in an excellent year.³⁴

Figure 2.8: Utility Scale Renewable Energy Projects Regional Contributions, 2024-2050



Source: Farmers for Climate Action and the Clean Energy Council Report

³³ PV Magazine, [Farmers and regional communities forecast to reap billions from clean energy shift](#), 19 November 2024

³⁴ Farmers for Climate Action and the Clean Energy Council, [Billions in the bush: Renewable energy for regional prosperity](#), November 2024

November 2024 saw Australian Conservation Foundation correctly note that it is the rising cost of fossil fuels that is underpinning rising energy costs for Australian industry and consumers. Methane gas prices in Australia follow the international benchmark which spiked by 10 times at the beginning of Russia's invasion of Ukraine. And thermal coal prices are double the long-term average in our domestic market, as they are internationally, having been as high as nine times the long term average thanks to Putin, and the industry's willingness to gouge domestic customers using our own 'public' resources multinational corporations now control, free of constraint or regard for the cost of living crisis they have inflicted on us, even putting aside the climate crisis they continue to profit from.³⁵

November 2024 saw the Clean Energy Regulator state in its latest quarterly report that a record 7.2-7.5GW of new wind and solar capacity (including 3.15GW of new rooftop solar) is expected to be added under the renewable energy target in 2024, beating the previous record of 7.16 GW in 2020. This includes Australia's two biggest wind farms – the 923MW MacIntyre project in Queensland and the 756MW Golden Plains project in Victoria, plus the 450MW Clarke Creek wind farm.³⁶

Investors see Renewable Energy Infrastructure as a Key Priority

December 2024 saw the new Infrastructure Partnerships Australia report highlighting the growing trend over recent years that many investors remain firmly focused on the energy transition. The report cites: "This year, energy asset classes take a clean sweep of the podium, with firming and storage, transmission and distribution, and renewable generation comprising the top three forms of infrastructure investors are interested in. The preference for battery and short duration storage exceeds that of longer duration storage, driven by swifter approval and delivery processes, lower planning risk, and the volatility of the grid offering investors more compelling rewards. The dominance of Australia's energy transition as a driver of investment is reflected in a burgeoning pipeline, with 264 energy projects, reflecting A\$604 billion in capex, listed on the Australia and New Zealand Infrastructure Pipeline. This represents a 175% increase in the number of listed projects and a 144% increase in total cost over just the past three years."³⁷

Whilst grid storage, transmission and renewable energy assets were the top three ranked infrastructure sectors across Australia, non-renewable energy generation was ranked as the absolute least favoured sector. Investor interest in PHS has halved relative to the evaluation of just one year ago, reflecting of the ongoing capital cost and timetable blowouts evidence. Nuclear does not even rate a mention, being uninvestible.

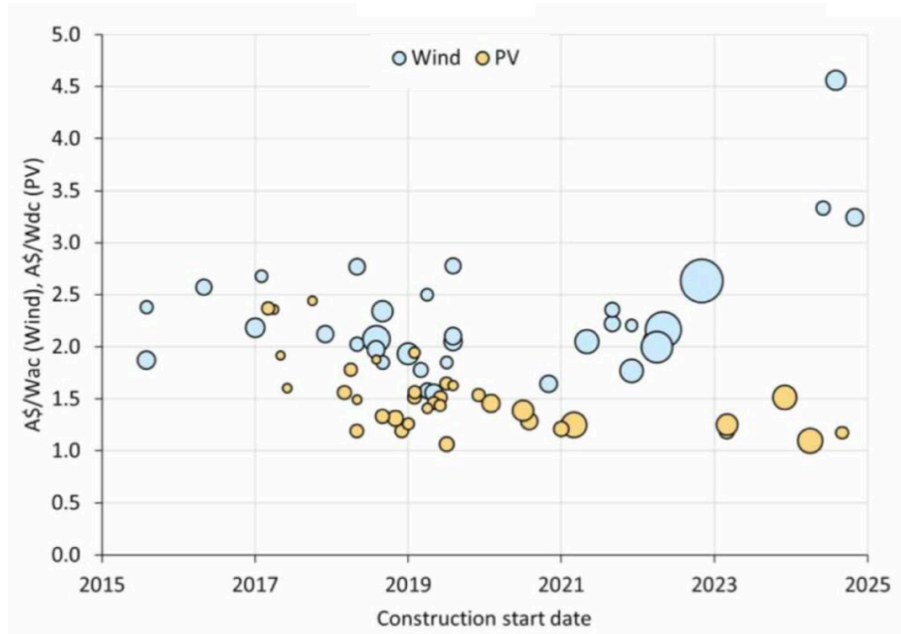
³⁵ The Newcastle Herald, [The truth about our rising power bills](#), 21 November 2024

³⁶ RenewEconomy, [New tender opens for another 6 GW of wind and solar as record year puts 2030 renewables target within reach](#), 28 November 2024

³⁷ Infrastructure Partnerships Australia, [Australian Infrastructure Investment Monitor](#), December 2024

2023 and 2024 have seen increased wind project capital cost increases, while solar have been steady to continued deflationary, with lower solar module prices offsetting rising interest rates – Figure 2.9.

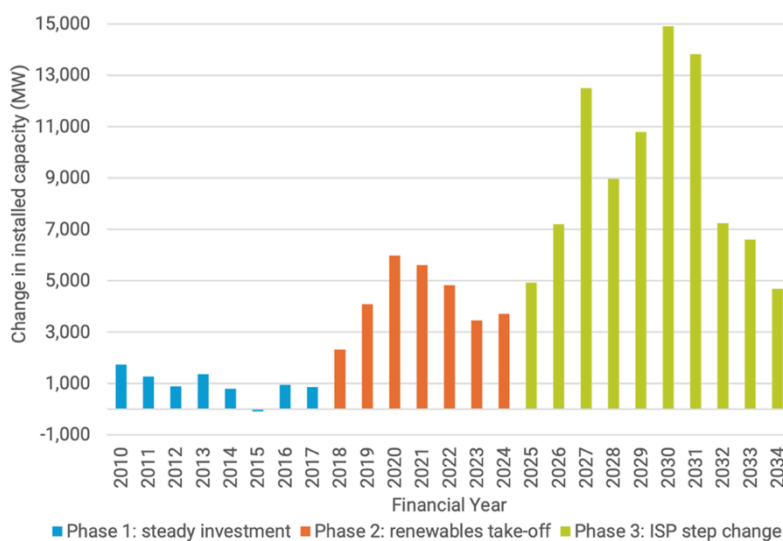
Figure 2.9: Utility Wind and Solar Project Capex in Australia



Source: Rystad Energy, December 2024³⁸

The task ahead is going to be challenging, with the AEMO ISP flagging the need for 7-12GW pa of new capacity, including 3GW pa of rooftop solar – Figure 2.10, but recent momentum is very supportive of 82% renewables by 2030 target being achieved, with sustained policy support.

Figure 2.10: Change in NEM installed generation capacity, MW, including rooftop PV



Source: AEMC, derived from AEMO’s ISP, November 2024

³⁸ RenewEconomy, [Plunging cost of big batteries: Latest gigawatt scale project may set new price benchmark](#), 10 December 2024

Section 2.1 Building Momentum – New Generation

After a prolonged new energy investment drought instigated by the previous government, 2024 has seen a strong uplift in planning approvals, and a major expansion of project proposals moving forward to FID, construction and commissioning. CEF details here recent progress in Australian utility scale VRE projects, and we note the rising number of hybrid renewables + BESS, detailed in Section 2.2.

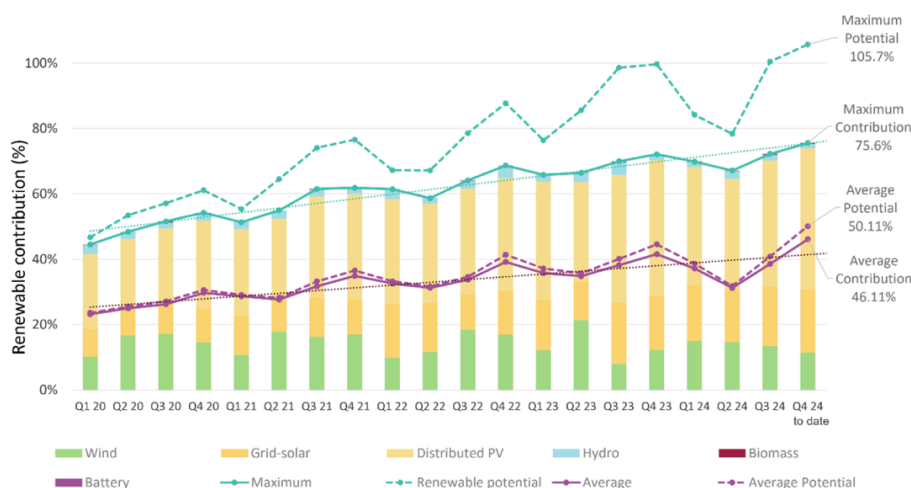
November 2024 saw ITK Renewables estimate a record 8.3GW of new utility scale wind and solar projects are currently under construction or commissioning across the NEM.³⁹

The Clean Energy Regulator highlighted that Australia is on track to approve for connection a record 7.2-7.52GW of new wind and solar (including rooftop) in 2024, with 2024 likely set to see a record number of FIDs approved as well, painting a strong picture for continued momentum in 2025, and the Clean Energy Regulator forecasts renewable energy penetration to reach 45% in 2025, after averaging close to 40% in 2024.^{40 41}

We detail some of the rapidly growing list of new generation projects seeing positive momentum in approvals, reaching FID, getting into construction and then progressing through completion and grid connection by state below.

December 2024 saw AEMO highlight the rising risk of minimum on grid demand as further undermining the viability of inflexible coal fired power plant clunkers, and the rapidly accelerating need for batteries, including PHS and batteries on wheels (EV), plus DRM to manage the accelerating share of low cost, zero emissions but intermittent renewable energy – Figure 2.11.⁴²

Figure 2.11: Coal Capacity in the NEM, FY2010-FY2050



Source: AEMO, December 2024

³⁹ RenewEconomy, [We need lots of wind and BESS to move peak prices lower](#), 1 November 2024

⁴⁰ Clean Energy Regulator, [2024 shapes as a record-breaking year for renewable energy deployment](#), 28 November 2024

⁴¹ The Conversation, [Record renewables go into the grid in 2024, generating 45% of electricity in 2025](#), November 27, 2024

⁴² AEMO, [2024 Transition Plan for System Security](#), December 2024

NSW

Abercrombie Wind Farm & BESS- Vestas

November 2024 saw Vestas lodge for federal environmental approval for its 2.5GW Abercrombie Wind Farm and 1GW/4GWh BESS near Hay, NSW.⁴³

October 2024 saw Vestas, in partnership with Copenhagen Infrastructure Partners, refine plans for its development of the up to 730MW Winterbourne wind farm, proposed for construction near the town of Walcha in the NSW New England region, being undermined by the Federal LNP.⁴⁴

Vestas is also behind the up to 550MW Piambong wind farm and a 100MW/200MWh BESS near Mudgee, in the Central West Orana Renewable Energy Zone.

Lake Victoria Wind Farm & BESS - Westwind

November 2024 saw Westwind lodge its proposed 1.5GW Lake Victoria Wind Farm and 600MW / 2,400MWh BESS at Wentworth in south-western NSW in the approvals queue with the Federal Environment Minister.⁴⁵

Barneys Reef Wind farm - RES

October 2024 saw the abandonment of the proposed 476MW Barneys Reef wind farm, north of Gulgong in the Central-West Orana REZ from the federal environmental assessment process after more than two years waiting in the Federal approval queue, having been first proposed in 2020. The proponents – the UK-based RES Group - put it down to ““This decision has been made in light of the changing economic and planning requirements for NSW wind farm development, which makes this project challenging for RES to proceed with at this time.” NSW Planning Minister Paul Scully defended the renewable planning regulations, noting several other proposals had made progress under the revised system. Renew provides further context, highlighting that the project appears to have already been pulled from NSW planning in August, with a letter to the state planning department stating the project “is not viable” - making it hard to decipher exactly what undid the project.⁴⁶

Spicers Creek Wind Farm – Squadron Energy

October 2024 saw NSW IPC give approval for Squadron Energy’s \$2bn 700MW Spicers Creek wind farm and associated 400 MW/1,800MWh BESS in the Central West Orana REZ, NSW.⁴⁷

December 2024 saw the Spicers Creek Wind Farm selected under the CIS Generation tender.⁴⁸

⁴³ RenewEconomy, [Danish wind giant Vestas unveils plans for 2.5 GW wind and 4 GWh battery project in NSW](#), 1 November 2024

⁴⁴ RenewEconomy, [Giant wind farm behind Barnaby “poo tickets” outburst changes layout, trims turbine numbers](#), 17 October 2024

⁴⁵ RenewEconomy, [WestWind goes big again, with plans for 1.5GW wind farm and 2,400 MWh battery in NSW](#), 15 November 2024

⁴⁶ RenewEconomy, [“Not viable:” Huge NSW wind project withdrawn over planning and economic concerns](#), 9 October 2024

⁴⁷ RenewEconomy, [Forrest gets planning approval for \\$2 billion wind and big battery project in central west](#), 1 November 2024

⁴⁸ Squadron Energy press release, [Spicers Creek Wind Farm selected for Capacity Investment Scheme](#), 11 December 2024

Uungula Wind Farm – Squadron Energy

October 2024 saw Squadron Energy's 414MW Uungula wind farm near Wellington give a project update as it progresses into five months under construction.⁴⁹ December 2023 saw the Uungula wind farm win the NSW LTESA Round 3 Tender.⁵⁰

Bookham Wind Farm – Squadron Energy

October 2024 also saw Squadron announce it is preparing a Scoping Report for submission to the NSW Department of Planning, Housing and Infrastructure (DPHI) for its proposed 594MW Bookham wind farm project, and an as yet unspecified BESS west of Yass, NSW.⁵¹

Conargo Energy Hub – Squadron Energy

November 2024 saw Squadron Energy file for Federal Government approval of its 300MW Conargo wind farm near Deniliquin in the South West REZ, supported by a 150MW / 1,200MWh BESS.⁵²

This is close to Squadron Energy's proposed 840MW Gol Gol Wind Farm near Buronga, which is proposed to be aligned with its proposed 600MW Gol Gol Solar Farm and 1,500MW capacity / 12 hour duration Gol Gol BESS. This proposal has lodged its scoping study and the NSW DPHI is preparing its SEARs.⁵³

Junction Rivers Wind Farm & BESS – Windlab

December 2024 saw Windlab's proposed the 585MW Junction Rivers Wind Farm and 800MWh BESS near Balranald, NSW selected under the Federal government CIS.⁵⁴

Sunnyside Wind Farm – CIP's Voyager Renewables

November 2024 saw Danish energy giant Copenhagen Infrastructure Partners (CIP, AuM >A\$50bn) launch a new Australian subsidiary called Voyager Renewables with a 10-year plan to develop 6GW of renewable energy across Australia out of its 40GW pipeline in Australia.

A first early stage proposal is the 450MW Sunnyside wind farm project proposed for NSW's South-West Renewable Energy Zone. A second 2GW proposal, called Energy Oasis, is a hybrid wind, solar and BESS project in NSW's west.⁵⁵ A third proposal is a 240MW / 480MWh BESS at Summerfield in South Australia announced back in November 2023.⁵⁶

CIP entered Australia in late 2017, investing in the 2.2GW Star of the South – Australia's most advanced offshore wind project. Cbus Super has a 10% stake in Star of the South with other Australian supers also invested in CIP's funds.⁵⁷

⁴⁹ Squadron Energy, [Uungula Wind Farm project Update](#), October 2024

⁵⁰ RenewEconomy, [NSW secures another \\$4.2 billion of wind, solar and storage to help shift from coal](#), 18 December 2023

⁵¹ RenewEconomy, [Forrest's Squadron Energy unveils massive new wind and battery project for NSW](#), 30 October 2024

⁵² RenewEconomy, [Andrew Forrest seeks green tick for another wind and battery project as Clarke Creek powers up](#), 29 November 2024

⁵³ Squadron Energy, [Gol Gol Renewable Energy Projects Update](#), July 2024

⁵⁴ [Junction Rivers Bringing opportunity home for a new generation](#)

⁵⁵ RenewEconomy, [Danish giant launches Australian renewables play with 6 GW of wind, solar and battery plans](#), 7 November 2024

⁵⁶ RenewEconomy, [Denmark's CIP unveils 480MWh battery as part of big storage push in Australia](#), 22 November 2023

⁵⁷ [Voyager Renewables](#)

Valley of the Winds Wind Farm – ACEN Australia

December 2024 saw ACEN Australia’s proposed the 936MW Valley of the Winds farm near Coolah, NSW in the CWO REZ selected under the Federal government CIS.⁵⁸

Pines Wind farm – TagEnergy

October 2024 saw TagEnergy give preliminary details a potential 250 turbine of 8MW each to give a total of 2,000MW capacity for its Pines wind project in state forestry plantations owned by NSW Government’s Forestry Corporation in the central west of NSW, although that project may not come to fruition until the end of the decade.⁵⁹

The Pines wind project is one of four proposals awarded feasibility permits in the central west NSW by Forestry Corp in May 2024,⁶⁰ with the others being:

1. the Four Mile Creek Wind Farm Prospect proposal in the plantations around Canobolas near Orange by Spain’s Iberdrola;
2. the 500MW Sunny Corner wind farm proposed by Ireland’s Mainstream Renewables in partnership with Australia’s Someva Renewables, which in June 2024 had its first community consultation;⁶¹ and
3. the Bondo wind project in the softwood plantations of Bondo State Forest by Canada’s Brookfield’s Neoen Australia, which in September 2024 had its first community consultation.⁶²

Hillview Wind Farm – ACE Power

November 2024 saw ACE Power propose the \$370m 200-300MW Hillview wind farm in New England, NSW. This proposal is to be co-located with the 270MW Hillview solar farm and 1000 MW Eastern Hub four to eight hour BESS.⁶³

Thunderbolt Wind Farm – Brookfield’s Neoen

December 2024 saw Brookfield’s Neoen 230MW Thunderbolt Wind Farm NSW selected under the CIS Generation tender following Federal Government EPBC approval in November 2024 after a significant downsizing due to Federal LNP whipped up ‘community’ hysteria.⁶⁴

Tallawang Solar Farm - RES

October 2024 saw RES confirm it was continuing with its 500MW Tallawang Solar Farm in the Central-West Orana REZ, which is progressing through the planning process and is soon to apply for Access Rights.⁶⁵

⁵⁸ ACEN Renewables, [Valley of the Winds](#)

⁵⁹ RenewEconomy, [Plans to be unveiled for 250 turbine wind project – the biggest in main grid – in state pine plantation](#), 10 October 2024

⁶⁰ Renew Economy, [Forestry Corp awards permits to four big wind projects in state plantation forests](#), 24 May 2024

⁶¹ Someva Renewables, [Sunny Corner wind farm](#)

⁶² Neoen Australia, [Bondo Wind Farm](#)

⁶³ RenewEconomy, [Ace Power hits go on brave new proposal for a New England wind farm, along with solar and battery](#), 27 November 2024

⁶⁴ RenewEconomy, [Neoen set to launch Thunderbolt wind project, despite Joyce campaign in heart of New England](#), 18 November 2024

⁶⁵ RenewEconomy, [“Not viable:” Huge NSW wind project withdrawn over planning and economic concerns](#), 9 October 2024

Rosedale Solar Farm – Clara Energy

October 2024 saw reports Clara Energy is proposing Project Rosedale, a 250MW solar farm and associated green hydrogen concept near Mundarlo, NSW showing the climate science hypocrisy of the Federal LNP, given their former minister is chair.⁶⁶

Culcairn Solar Farm – Neoen

December 2023 saw Neoen's 350MW Culcairn solar farm win the NSW LTESA Round 3 Tender.

Pottinger Energy Park – Wind, Solar, BESS - Someva / AGL

October 2024 saw the 1.5 GW Pottinger Energy Park near Hay in south-west NSW saw zero local objections in its community consultation process as it heads towards a NSW IPC review.⁶⁷ March 2024 saw AGL Energy unveil plans in partnership with Someva for this proposed development that would include 1.2GW of wind, 300MW of solar and a 500MW / 2,000 MWh BESS.⁶⁸

Goulburn River Solar Farm, BESS - Lightsource bp

December 2024 saw Lightsource bp's \$880m, 450MW Goulburn River Solar Farm with a 49MW / 392MWh BESS commence construction, having received Federal Government EPBC approval in October 2024. Lightsource bp is using the mostly degraded grazing land, and will turn 1,200ha of the site over to a Biodiversity Stewardship Agreement, as part mitigation for that habitat loss – making a win for new investment, for limiting the biodiversity loss and for address the climate science.⁶⁹

December 2024 saw the Lightsource bp Goulburn River Solar Farm in NSW selected under the CIS Generation tender.

Sandy Creek Solar Farm - Lightsource bp

December 2024 saw the Lightsource bp Sandy Creek 700MW Solar Farm near Dunedoo, NSW selected under the CIS Generation tender. This project is being assessed as a State Significant Development (SSD). The Environmental Impact Statement (EIS) was submitted to DPHI in May 2024 for assessment.⁷⁰

Glenellen Solar Farm & BESS - Naturgy Group

November 2024 saw Global Power Generation (GPG) Australia (a subsidiary of Spain-headquartered Naturgy Group) award Perth Based Monford Group the EPC contract for the \$250m, 260MW Glenellen Solar Farm near Albury. GPG acquired this solar project proposal from Trinasolar in February 2024. Construction commenced October 2024 after Telstra signed a PPA for 50% of the project's output.⁷¹

⁶⁶ RenewEconomy, [Former Coalition minister and Nationals boss emerge as chair and CEO of solar and hydrogen hopeful](#), 31 October 2024

⁶⁷ RenewEconomy, [Massive renewables hub gets all clear from locals. but long distance activists complain about the view](#), 18 October 2024

⁶⁸ RenewEconomy, [AGL plans huge 2GW, 2,000 MWh wind, solar and battery hub in NSW](#), 4 March 2024

⁶⁹ RenewEconomy, [Big solar and eight hour battery project gets green tick. but wind hub put on hold](#), 9 October 2024

⁷⁰ [Sandy Creek solar](#)

⁷¹ PV Magazine, [Monford scores EPC contract for 260 MW Glenellen solar farm in NSW](#), 22 November 2024

Middlebrook Solar Farm & BESS – TotalEnergies

November 2024 saw TotalEnergies' A\$856m 320MW Middlebrook Solar Farm & 320MW / 780MWh BESS near Tamworth, NSW receive IPC approval. A high voltage grid transmission line crosses the 515ha property, easing grid connection. The IPC required the option of vegetation screening for any properties within 3km, if requested.⁷²

Gunning Solar Farm & BESS – Canadian Solar

November 2024 saw Canadian Solar's 250MW Gunning solar farm and 150MW / 600MWh BESS near Yass in NSW approved by the NSW government.⁷³

Myrtle Creek Solar and BESS - Ark Energy

August 2024 saw Ark Energy submit its development plans to the NSW Government for its 500MW solar farm and 275MW / 2,200MWh BESS at Myrtle Creek in northern NSW.⁷⁴

Walla Walla Solar Farm - FRV

November 2024 saw Fotowatio Renewable Ventures (FRV) Australia's 300MW Walla Walla solar farm near Albury in NSW begin generating, two years after reaching FID. FRV is owned by Saudi Abdul Latif Jameel Energy and Canadian pension fund OMERS.⁷⁵

Koorakee Energy Park– Squadron Energy

July 2024 saw Squadron Energy lodge its Scoping Report for the 2GW Koorakee Energy Park with the NSW Department of Planning, Housing and Infrastructure (DPHI) in preparation for its EIS public exhibit. This Park at Euston, NSW within the South West REZ is proposed to encompass a wind farm of up to 167 turbines, a solar farm and a BESS.⁷⁶

Glanmire Solar Farm & BESS – Elgin Energy

December 2024 saw the UK based Elgin Energy Glanmire 60MW Solar Farm and 104MWh BESS in Bathurst, NSW selected under the CIS Generation tender.⁷⁷ This project's development was approved in June 2024.⁷⁸

November 2024 saw Elgin Energy announce early stage progress at its Morven 125MW solar farm and 500MWh BESS proposal for Albury, NSW.⁷⁹

⁷² PV Magazine, [TotalEnergies secures IPC approval for solar farm and big battery project](#), 12 November 2024

⁷³ RenewEconomy, [Solar farm and four-hour big battery get green light in NSW. after seven years in the pipeline](#), 15 November 2024

⁷⁴ Energy Storage, [Ark Energy developing 2.2GWh, 8-hour BESS in Australia](#), 1 August 2024

⁷⁵ PV Magazine, [FRV announces production milestone for 300 MW Walla Walla Solar Farm](#), 26 November 2024

⁷⁶ Squadron Energy, [Koorakee Energy Park Community Newsletter - July 2024](#)

⁷⁷ Minister Bowen press release, [Fixing Australia's energy system now with new cheap, clean, reliable renewables](#), 11 December 2024

⁷⁸ [Glanmire Solar Farm](#)

⁷⁹ PV Magazine, [Elgin Energy progresses early stage of proposed 125 MW solar and BESS](#), 13 November 2024

Queensland

MacIntyre Wind Farm - Acciona

December 2024 saw Acciona Energía's 923MW MacIntyre wind farm project near Warrick, Queensland start operations.⁸⁰

July 2024 saw Acciona Energy file for Federal Government approval for its proposal to double the Southern Downs Renewable Energy Zone with the addition of the 1,000MW Herries Range wind project.⁸¹

Clark Creek Wind Farm – Squadron Energy

December 2024 saw Squadron Energy both start exporting electricity and install the 100th and final wind turbine foundation at its 450MW Clarke Creek stage I wind project half way between Rockhampton and Mackay in Queensland. Stanwell Corporation has underwritten the project with a 15 year PPA for 75% of the phase 1 output.⁸²

Squadron has proposed a stage II of another 94 turbines.⁸³

Squadron has also had a development application approved for its 400MW Clarke Creek Solar Farm.⁸⁴

Wambo Wind Farm – Stanwell and Cubico Investments

November 2024 saw work at the 500MW two-phase Wambo wind farm has been paused following a fatality at the Golden Plains Victoria wind farm which is using the same OEM supplier, Vestas. This project is being developed jointly by the Queensland state owned Stanwell and Cubico Investments.⁸⁵

Tarong West Wind Farm - RES

RES has state approval for the 436MW Tarong West wind farm in Queensland, inland from the Sunshine Coast, which it is developing for the state-owned Stanwell Corporation.

Lotus Creek Wind Farm – CS Energy

August 2024 saw state-owned CS Energy acquire from Copenhagen Infrastructure Partners the at start of construction \$1.3bn 285MW Lotus Creek wind farm near Saint Lawrence in central Queensland, with commissioning scheduled for 4QCY2026.⁸⁶

Broadsound Solar Farm & BESS - Iberdrola

September 2024 saw Spain's Iberdrola approve its 376MW Broadsound solar farm and 180MW / 360MWh BESS at Clarke Creek, north-west of Rockhampton in Queensland.

⁸⁰ Acciona, [MacIntyre wind precinct](#)

⁸¹ RenewEconomy, [Green tick sought to double size of Australia's biggest wind farm](#), 7 July 2024

⁸² Squadron Energy, [Clarke Creek Wind Farm powering ahead to bring clean energy to Queensland](#), 4 November 2024

⁸³ Squadron Energy, [Clarke Creek Wind Farm - Stage 2](#)

⁸⁴ Squadron Energy, [Clarke Creek Solar Farm](#)

⁸⁵ RenewEconomy, [Vestas suspends work on a gigawatt of projects as Golden Plains fatal accident investigated](#), 21 November 2024

⁸⁶ CS Energy press release, [CS Energy acquires Lotus Creek Wind Farm](#), 16 August 2024

Hopeland Solar Farm - ACS

December 2024 saw ACS's Hopeland 250MW Solar Farm in Queensland selected under the CIS Generation tender. August 2023 saw CIMIC Group's Pacific Partnerships subsidiary acquire the development rights for the 300MWdc Hopeland Solar Farm in Queensland, the second large-scale solar project to be owned and developed by Pacific Partnerships.⁸⁷

Bulli Creek Solar Farm - Genex

September 2024 saw Genex, now owned by Japan's J-Power, announce a 15 PPA for 550MW of solar with Stanwell to underpin its 775MW Bulli Creek Stage 1 proposal. A significant solar expansion and BESS are possible future expansion proposals.⁸⁸

South Australia

Goyder South Wind Farm - Neoen

July 2024 saw the biggest wind project to date in South Australia, Neoen's 412MW Goyder South wind farm near Burra, South Australia flag a three month delay to commissioning, now scheduled for 1QCY2025.⁸⁹ February 2024 saw the wind project reached financial close on the 203MW second tranche of the wind farm, along with the 238MW / 477MWh Blyth Battery.⁹⁰

Goyder North Wind Farm - Neoen

December 2024 also saw Neoen Australia's Goyder North stage 1 300MW Wind Farm in South Australia selected under the CIS Generation tender. Goyder North is in planning stages and is comprised of up to 1,000MW of wind power and up to 900MW / 3600MWh of BESS.⁹¹

Palmer Wind Farm – Tilt Renewables

December 2024 also saw Tilt Renewables' Palmer 274MW Wind Farm East of Adelaide in South Australia selected under the CIS Generation tender.⁹²

Northern Territory – New Solar Farms

November 2024 saw six large-scale solar farms capable of 180-210MW capacity and a BESS built next to existing transmission infrastructure are included in plans for a proposed 500ha Darwin Renewable Energy Hub. All electricity produced would be fed directly into the Darwin-Katherine grid, which supplies Darwin and surrounding areas, and is currently powered mostly from the methane gas powered Channel Island Power Station, south of Darwin, which is scheduled to close in 2026/27.⁹³

⁸⁷ [CIMIC's Pacific Partnerships acquires first Queensland solar project](#), 17 August 2023

⁸⁸ RenewEconomy, [Genex lines up new partner for biggest solar farm as coal giant steps in to fill Fortescue's hydrogen void](#), 17 September 2024

⁸⁹ RenewEconomy, [Delays flagged for South Australia's biggest wind project as damages claims prop up Neoen earnings](#), 26 July 2024

⁹⁰ RenewEconomy, [South Australia's biggest wind farm and Blyth battery hit financial close, on track to power BHP mine](#), 6 February 2024

⁹¹ [Goyder North](#)

⁹² [Palmer Wind Farm](#)

⁹³ PV Australia, [Six large-scale solar farms set for proposed Darwin renewable energy hub](#), 14 November 2024

Victoria

Golden Plains Wind Farm – TagEnergy (85%) / Ingka Group (15%)

October 2024 saw the largest wind farm in the Southern Hemisphere begin feeding into Victoria’s electricity grid. Once complete, the two-stage \$4bn, 1.33GW 215 turbine wind farm will produce more than 4,000GWh of energy each year and meet 9% of Victoria’s current energy demand. This may be supported by a 300MW 2/4-hour battery on site.^{94 95}

November 2024 saw work at this wind farm has been paused following a worker fatality.

Ryan Corner Wind Farm - Global Power Generation Australia (GPG)

December 2024 saw the commissioning of GPG’s 218MW Ryan Corner Wind Farm, building on the August 2024 commissioning of the 97MW Hawkesdale Wind Farm, both in Yambuk, South West Victoria.^{96 97}

Kentbruck Wind Farm – HMC Capital

December 2024 saw the Kentbruck 600MW Wind Farm near Nelson in Victoria selected under the CIS Generation tender. Neoen sold its Victorian operating assets and development pipeline to HMC Capital in December 2024.⁹⁸

Goorambat East Solar Farm - ENGIE

October 2024 saw the commencement of construction on ENGIE’s 250MW Goorambat East solar farm near Benalla in northern Victoria, due for commissioning in 2026, as a first major generation asset development towards ENGIE’s goal of delivering 3 GW of renewable energy in Australia by 2030.⁹⁹

Winton Solar Farm - FRV

September 2024 saw the commissioning of the 99MW Winton solar farm near Wangaratta, developed by Fotowatio Renewable Ventures (FRV), after getting a start as one of five projects successful in the first round of 800MW under the Victoria Renewable Energy Target (VRET1) auctions.¹⁰⁰

Muskerry Solar & BESS – Edify Energy

November 2024 saw Edify Energy’s 250MW Muskerry Solar & 200MW / 800MWh BESS near Bendigo, Victoria secure Federal Government Environment Minister Tanya Plibersek’s approval.¹⁰¹

⁹⁴ Premier of Victoria press release, [Australia’s Largest Wind Farm Golden For Victorians](#), 11 October 2024

⁹⁵ RenewEconomy, [Ikea owner takes another slice of Australia’s biggest wind project](#), 11 October 2024

⁹⁶ GPG, [Ryan Corner Wind Farm Fact Sheet](#)

⁹⁷ RenewEconomy, [Two major wind farms power up in Victoria, adding 300MW new renewables capacity](#), 11 December 2024

⁹⁸ [The Kentbruck Green Power Hub](#)

⁹⁹ RenewEconomy, [“Full-circle moment:” Engie starts work on first Victorian solar farm since Hazelwood closure](#), 24 October 2024

¹⁰⁰ RenewEconomy, [“Full-circle moment:” Engie starts work on first Victorian solar farm since Hazelwood closure](#), 24 October 2024

¹⁰¹ PV Australia, Edify lands federal approval for Victorian solar and storage project, 20 November 2024

Mokoan Solar Farm – European Energy Australia

December 2024 saw the European Energy Australia's Mokoan 46MW Solar Farm in Victoria selected under the CIS Generation tender.

Barnawartha Solar Farm & BESS – Gentari

December 2024 saw Malaysia's Petronas's Gentari's Barnawartha 64MW Solar Farm & 139MW BESS in Victoria selected under the CIS Generation tender.¹⁰²

Campbells Forest Solar Farm – Risen Energy

December 2024 saw China's Risen Energy's Campbells Forest 205MW Solar Farm in Loddon Shire Victoria selected under the CIS Generation tender.

This project appears to have been developed by South Energy.¹⁰³ Growland Group's South Energy has a pipeline for solar farm development, with another four projects in planning in Victoria and a further two in Western Australia. These include: the 75MW Goorambat Solar Farm, the 145MW Kennedys Creek Solar Farm, the 190MW West Mokoan Solar Farm (which now seems to be part of Lightsource bp) and the 77MW Frasers Solar Farm. In Western Australia this covers the 100MW Bengel Solar Farm and 180MW Waroona Solar Farm.

West Mokoan Solar Farm & BESS – Lightsource bp

December 2024 saw Lightsource bp's West Mokoan 300MW Solar Farm and 560MWh BESS in Benalla in Victoria selected under the CIS Generation tender.¹⁰⁴

Barwon Solar Farm & BESS – Elgin Energy

December 2024 saw UK solar developer Elgin Energy's Barwon 250MW Solar Farm and 500MWh BESS in Victoria selected under the CIS Generation tender.

December 2024 also saw Elgin Energy's Elaine 125MW Solar Farm and 250MWh BESS in Victoria selected under the CIS Generation tender. May 2024 saw this proposal gain State Planning approval.¹⁰⁵

Girgarre Solar Farm - Potentia Energy

December 2024 saw Potentia Energy, the Australian joint venture of Italy's Enel Green Power and Japan's Inpex moving to commissioning of its \$140m, 93MW Girgarre Solar Farm near Shepparton, in Victoria.¹⁰⁶ Potentia Energy reports it has rights secured for a development pipeline of 7GW across Australia.

¹⁰² [Barnawartha Solar and Energy Storage](#)

¹⁰³ [South Energy](#)

¹⁰⁴ [West Mokoan Solar](#)

¹⁰⁵ PV Magazine, [Elgin gets green light for biggest solar and storage project to date](#), 14 May 2024

¹⁰⁶ PV Magazine, [Potentia Energy revealed as new brand for leading Australian renewable energy company](#), 10 December 2024

Tasmania

Western Green Energy Hub - Hydro Tasmania & Birdwood Energy

November 2024 saw Hydro Tasmania and Birdwood Energy announce the state's largest solar project, the \$500m 288MW Northern Midlands solar project. The solar project is being built by TasRex, who have a pipeline of 5 GW of wind and solar projects in Tasmania alone – mostly offshore wind, and a potential upsizing of the Northern Midlands solar project to more than a gigawatt.¹⁰⁷

West Australia

Western Green Energy Hub - InterContinental Energy & CWP Global

November 2024 saw Singapore-based InterContinental Energy and CWP Global announce one of the world's biggest wind and solar proposals, planned for a remote desert region in south-east of Western Australia, and has now lodged its application for state environmental approvals with a significantly upgraded target of 70GW of wind and solar capacity (50GW previously). The Western Green Energy Hub envisages up to 3,000 wind turbines –up to 20MW each – and six million solar panels installed across 2.29 million hectares of pastoral leases and crown lands. The other partner is Mirning Green Energy Limited (MGEL), a commercial subsidiary of Mirning Traditional Lands Aboriginal Corporation (MTLAC), which is the registered native title representative body. A FID for a first stage 6GW investment is not planned until 2029.¹⁰⁸

Jinbi Solar Farm - Yindjibarndi Energy Corporation & ACEN Australia

December 2024 saw Western Australia's regional Development Assessment Panel on deliver the final approvals for construction of a 150MW solar farm by the Yindjibarndi Energy Corporation (YEC) in partnership with ACEN Australia.¹⁰⁹

YEC plans to develop, own and operate large-scale renewable energy projects of up to 3GW in Western Australia's Pilbara region. The first stage of the project requires an investment of more than \$1 billion to generate more than 750MW of solar, wind and BESS.¹¹⁰

Junja Solar Farm – Pilbara Solar

December 2024 saw Western Australia's Horizon Power approve an Offer to Connect for to its coastal network for a \$30m 10MW solar farm near Port Headland being developed by Pilbara Solar, 50% owned by the Yamatji Marlpa Aboriginal Corporation (YMAC), a not-for-profit Aboriginal Corporation. The first of its kind in the Pilbara in terms of actually partnering with First Nations people.¹¹¹

¹⁰⁷ RenewEconomy, [Tasmania's first large scale solar project to be built after landing contract with state owned utility](#), 1 December 2024

¹⁰⁸ RenewEconomy, [Australian wind and solar project sized at remarkable 70 gigawatts – as big as the country's main grid](#), 11 November 2024

¹⁰⁹ RenewEconomy, [Two First Nations-backed solar farms cleared to help power Pilbara and its huge iron ore mines](#), 5 December 2024

¹¹⁰ First Nations Clean Energy Network, [Yindjibarndi Renewable Energy Project](#)

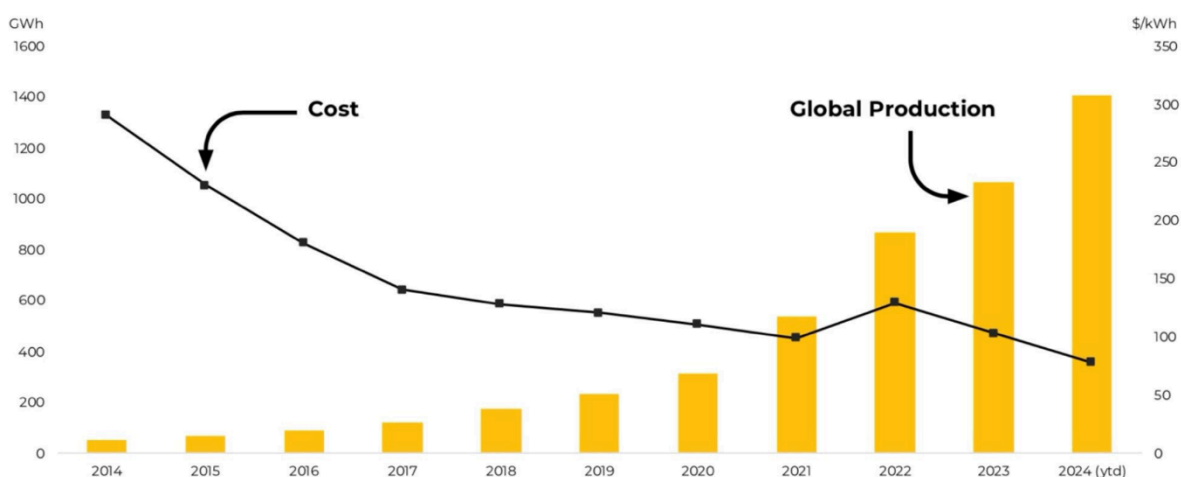
¹¹¹ Renew Economy, [Two First Nations-backed solar farms cleared to help power Pilbara and its huge iron ore mines](#), 5 December 2024

Section 2.2 Building Momentum – New BESS

Many incumbent energy lobbyists highlight the grid reliability risks of integrating ever more variable renewable energy projects. The technology improvements, manufacturing scaling up, commodity price reductions and resulting BESS deflation over 2024 has been staggering, and really underpins the credibility and deliverability of Australian Energy and Climate Minister Chris Bowen's 82% by 2030 target.

Goldman Sachs estimates global battery prices dropped from US\$153/kWh in 2022 to US\$149 in 2023, and US\$111 in 2024, driven by rapid technology investment, the economies of scale from the ongoing global capacity expansion and dramatically lower critical minerals commodity prices. By 2026, Goldman Sachs forecasts prices will have dropped 50% to reach US\$80/kWh, achieving BEV-ICE cost parity in US on an unsubsidised basis.¹¹² In markets like Australia where Chinese exports are unfettered, battery prices in 2024 have already reached below these new record lows, as BMI estimates – Figure 2.12.

Figure 2.12: Global Battery Pack Prices Continue to Fall (US\$/kWh)



Source: Benchmark Mineral Intelligence (BMI), 6 December 2024

The global uptake of BESS is staggering, and highly complementary to the low cost and zero emissions but intermittent nature of renewable energy.

Bloomberg NEF expects a massive 76% jump in global storage installations to 69GW / 169GWh in 2024, and for a tenfold expansion in global BESS storage by 2035 to reach 228GW / 965GWh, led by China, with the US a distant second – Figure 2.13.¹¹³

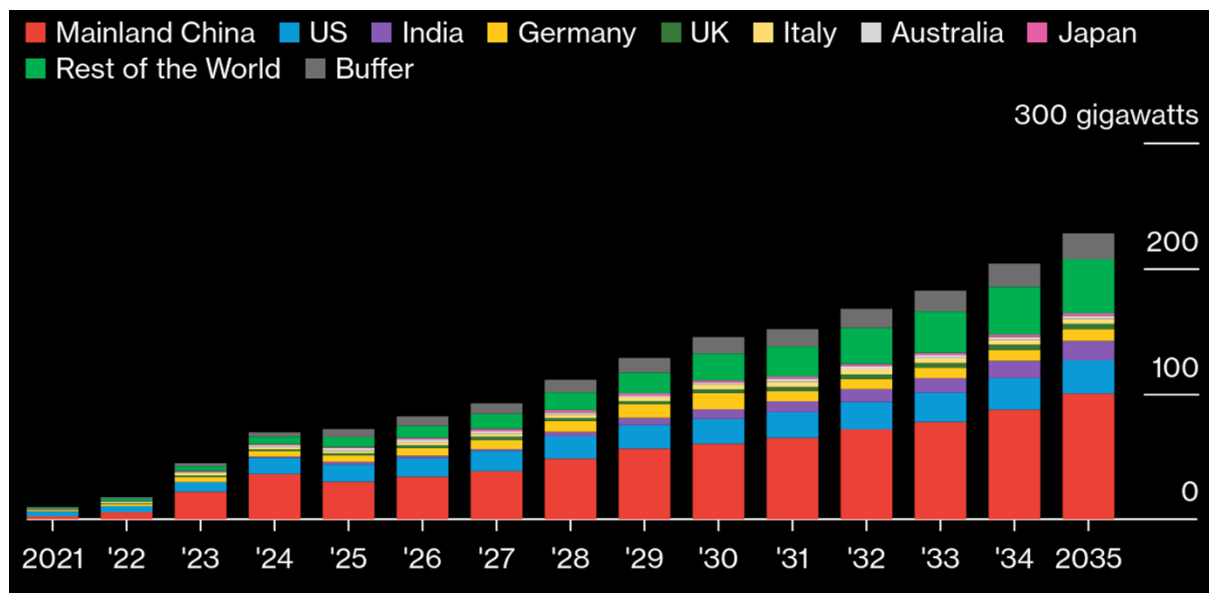
The US is now adding utility-scale BESS at an unprecedented pace, having installed more than 20GW of battery capacity to the electric grid, with 5GW of this occurring just in the first seven months of 2024, according to the US Energy Information Administration (EIA). This means that battery storage equivalent to the output of 20 nuclear reactors has been bolted on to America's electric grids in barely four years, with the EIA predicting this capacity could double again to 40GW by 2025.¹¹⁴

¹¹² Goldman Sachs, [EV battery prices are expected to fall almost 50% by 2026](#), 7 October 2024

¹¹³ Bloomberg NEF, [Headwinds in Energy Storage Markets Won't Deter Growth](#), 11 November 2024

¹¹⁴ The Guardian, [US power grid added battery equivalent of 20 nuclear reactors in past four years](#), 24 October 2024

Figure 2.13: BESS is Set for a Decade of Growth, Additions by Market (GW)



Source: Bloomberg NEF, *Headwinds in Largest Energy Storage Markets Won't Deter Growth*

July 2024 saw with Saudi Arabia's investment group Aljihaz Holding announce it had signed at the time the largest BESS contract in the world to-date, that being a 7.8GWh installation contract with China's Sungrow. This contract is for the supply of 3x 2.6GWh BESS, with grid connection due as early as 2025.¹¹⁵

July 2024 then saw with US developer Intersect Power is looking to deploy 15GWh of Tesla's Megapacks across its solar-plus-storage project portfolio through 2030, building on the 2.4GWh of solar-and-BESS Intersect Power already has in operation or under construction.¹¹⁶

October 2024 saw Netherlands-based Giga Storage advance its massive 700MW / 2.8GWh Green Turtle BESS in Dilsen-Stokkem, northeastern Belgium, showing the broad geographic support for ever-larger BESS projects.¹¹⁷

October 2024 saw a solar and battery project in Chile award CATL a BESS supply contract for the fourth stage of the project, building on the three prior awards to BYD. The Oasis de Atacama project in Chile by Spain's Grenergy is the 'world's largest energy storage' project with a total 11GWh of battery capacity and 2GW of solar PV.¹¹⁸

November 2024 saw Meralco PowerGen of the Philippines commence construction of its new US\$4bn 3.5GW Terra Solar project that includes a 4.5GWh BESS, due for progressive completion by 2027. This is the largest hybrid renewables plant in ASEAN, to-date.¹¹⁹ Meralco is considering replicating its new 3.5GW Terra Solar & 4.5GWh BESS project.¹²⁰

¹¹⁵ ESS News, [Sungrow secures 7.8 GWh battery storage deal with Saudi Arabia's Aljihaz Holding](#), 16 July 2024

¹¹⁶ ESS News, [Tesla lands 15.3 GWh Megapack supply contract](#), 19 July 2024

¹¹⁷ ESS News, [Giga Storage's battery project in Belgium expands to 2.8 GWh](#), 8 October 2024

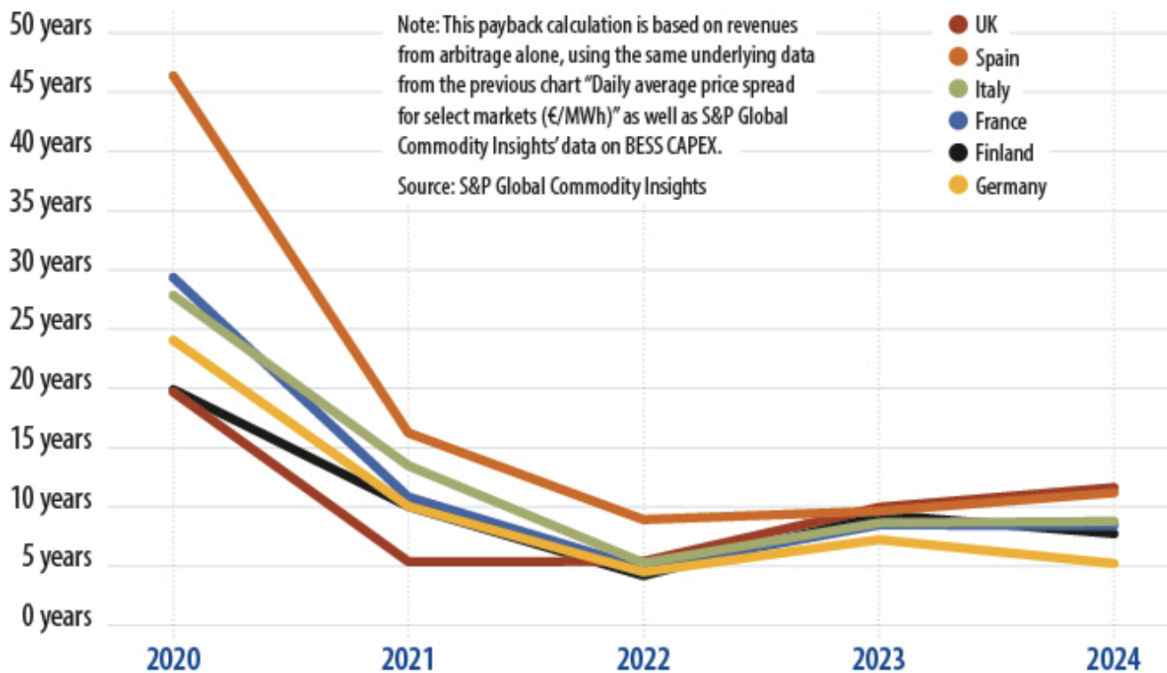
¹¹⁸ Energy Storage News, [CATL to supply Grenergy 1.25GWh BESS for 'world's largest energy storage project' in Chile](#), 30 October 2024

¹¹⁹ PV Magazine, [World's largest 3.5 GW Terra solar project breaks ground in the Philippines](#), 22 November 2024

¹²⁰ Asian Power, [MGen may 'mimic' \\$4b solar project north of Manila](#), 12 November 2024

November 2024 saw S&P Global Commodity Insights detail the benefits of ongoing BESS system cost declines, continually improving technology capacities and increasing prevalence of wider price spreads due to the surging share of intermittent renewable energy generation. Payback periods continue to decline globally even when only considering arbitrage profits, rather than additional revenues from grid FCAS – Figure 2.14.

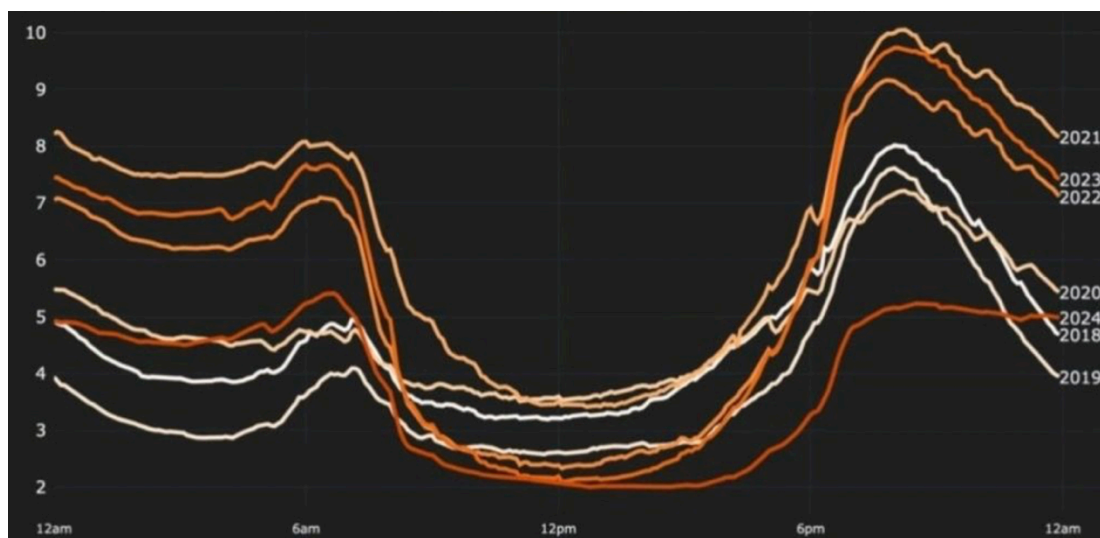
Figure 2.14: Payback Period – Four Hour BESS



Source: S&P Global Commodities Insights, via PV Magazine

The need for gas firming to complement solar in California peaked in 2021, and has since diminished significantly due to the installation of 12GWh of BESS over the last four years – Figure 2.15.

Figure 2.15: California's Grid Reliance on Methane Gas Firming (2018-2024)



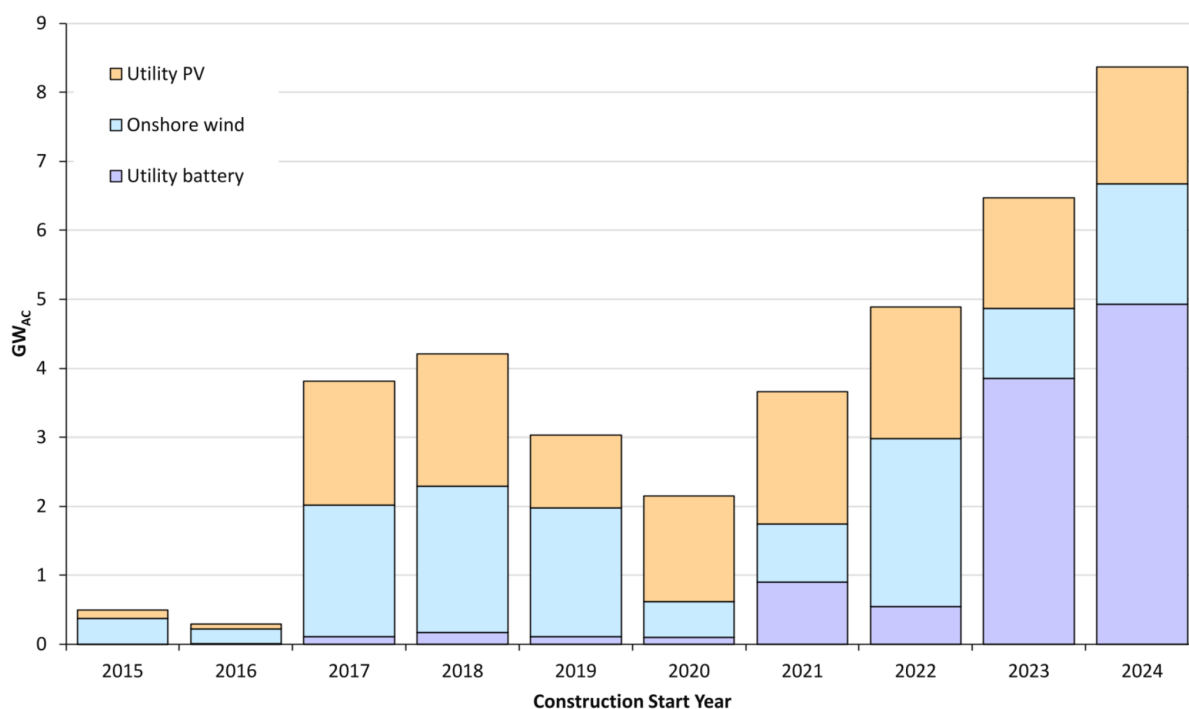
Source: CAISO US via [James Carter](#)

Australian BESS Momentum

Momentum in BESS deployments in Australia has lifted dramatically in 2024. The volume of large-scale BESS under construction in Australia passed that of solar and wind projects combined in 2023 and the trend has intensified this year, with batteries attracting federal support. As coal-fired power plants are shuttered, developers and suppliers are enjoying a battery bonanza, with Rystad Energy has said that 4.9GWac / 13GWh of utility-scale BESS entered construction in 2024 - Figure 2.16.

As of October 2024, BloombergNEF records 7.8GW of utility-scale BESS currently under construction in Australia. It says installed big battery capacity will grow from 1.7GW today to 18.5GW in 2035. CEF predicts this 18.5GW will be rapidly upgraded and pulled forward as low cost intermittent renewable energy increasingly dominates the NEM and drives wholesale prices negative increasingly frequently. AEMO’s fears of how it will manage minimum on-grid demand is easily turned into a massive financial opportunity for BESS arbitrage to time-shift solar generation from times of oversupply to when on-grid demand is high e.g. predictably when the sun sets most days. BNEF’s Leonard Quong states: ““Across all of 2023, wholesale prices on the east coast were below zero around 9% of the time. In some states, that was more than 25% of the time. So increasingly, batteries are being built to participate in the wholesale market to arbitrage prices. As a consequence, we’re seeing bigger batteries.” And Australia’s big batteries are getting bigger, with storage capacities rising from one hour to two, four, and even eight hours. BNEF says a “tsunami of rooftop solar” and utility-scale solar has “reshaped power price dynamics in Australia” and as a result the arbitrage opportunity, with wholesale prices below zero for 9% of the time in the NEM in 2023, for big battery storage systems has become compelling.¹²¹

Figure 2.16: Utility scale renewables and BESS projects starting construction, GW



Source: Rystad Energy, December 2024

¹²¹ PV Magazine, [Australia’s big battery bonanza](#), 19 October 2024

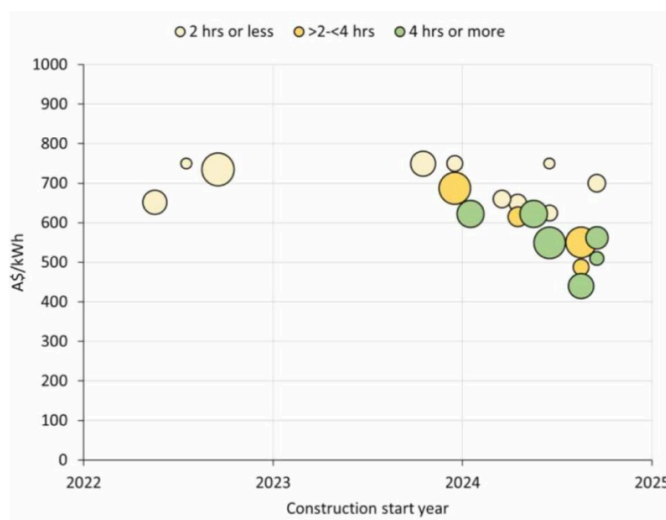
November 2024 saw AEMO’s 2024/25 Summer Readiness Report. The key risk is unavailability of thermal power plant capacity, including the potential delayed return to service of the 12 thermal units off line in 4QCY2024 around Australia.¹²² A key point of difference versus a year ago is that this summer there is 3,175MW of new generation and BESS projects that have been commissioned to full output in the NEM since September 2023, including 750MW BESS.¹²³ If only Australia had used the last decade to act with urgency at scale to build out more firm VRE knowing that end of life coal clunkers were increasingly unreliable, particularly at times of high temperatures accentuated by climate!

The challenge is that the Federal Opposition’s nuclear fantasies will massively undermine the momentum being built. It is noteworthy that despite the claims of the opposition, former coal-fired power plant sites are already attracting large-scale battery projects due to their electricity infrastructure. AGL is building the 1GWh Liddell Battery Project in NSW, in May 2024 the state-owned generator in Queensland announced it was doubling the size of its Stanwell Clean Energy Hub battery, to 1.2GWh, and the Collie Battery in Western Australia is planned to have an eventual 1GW / 4GWh scale, including a 877MWh first stage.

November 2024 also saw Wartsila, one of Australia’s largest battery investors and EPC firms, highlight Australia’s surging BESS market requires regulators and policy makers to establish effective frameworks for market access and get the market signals right to ensure continued investment, including accelerating evaluation and approval of new projects of state significance.¹²⁴ Section 3.1 references the new committee being chaired by Tim Nelson to hopefully deliver on this request. We note the progress made to accelerate evaluation and approval times across Victoria, WA and NSW over 2024 – refer Section 3.

December 2024 saw the CSIRO / AEMO GenCost Report flag the price of battery storage has plunged more than 20% in the last 12 months, as supported by Rystad – Figure 2.17.

Figure 2.17: Utility BESS project Capex in Australia



Source: Rystad Energy, December 2024¹²⁵

¹²² AEMO, [2024/25 Summer Readiness Report](#), 14 November 2024

¹²³ RenewEconomy, [Big battery summer: AEMO says new storage capacity to play key role in keeping lights on](#), 3 December 2024

¹²⁴ PV Magazine, [Wartsila says signals must be right to safeguard battery investment](#), 29 Nov 2024

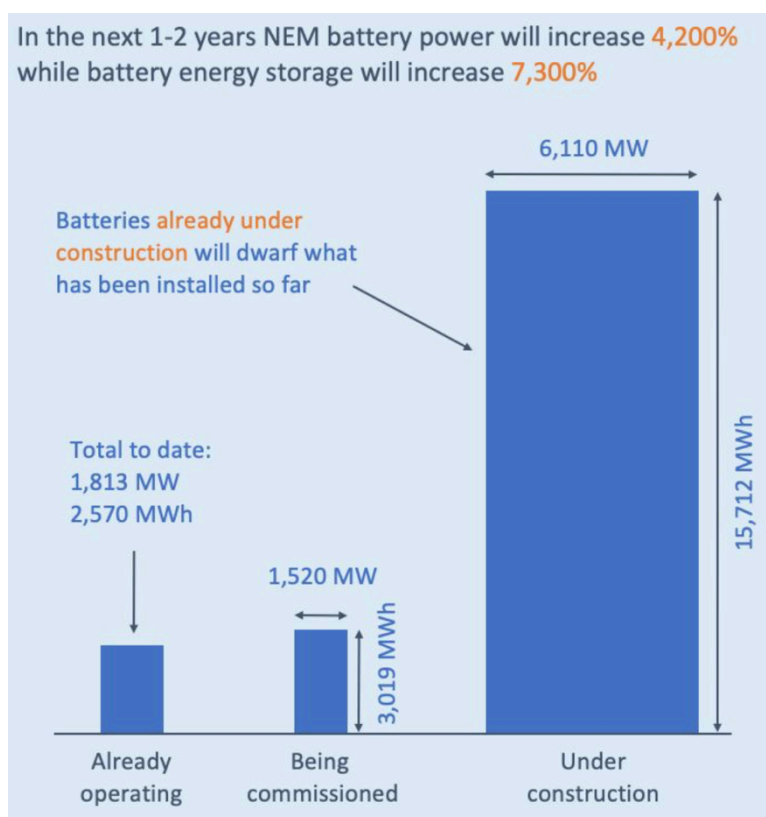
¹²⁵ RenewEconomy, [Plunging cost of big batteries: Latest gigawatt scale project may set new price benchmark](#), 10 December 2024

With rooftop solar sending midday prices negative, battery developers are being paid to charge up in the middle of the day. And with a steady 3 GW of new rooftop solar every year, this arrangement will continue for a while, until there is enough midday demand to raise prices.

Australia's first grid scale battery was the 100MW/108MWh Hornsdale Power Reserve in South Australia. This was commissioned in 2017.

In the seven years since then, Australia's main grid has installed a total of 1,813MW / 2,570MWh of battery storage. There are already enough battery projects being commissioned at the moment to roughly double this. And as of December 2024 there are another 6,110MW / 15,712MWh of batteries that are already under construction. Batteries are quick to deploy, so these are all likely to be complete within 1-2 years – Figure 2.18.

Figure 2.18: The Tidal Wave of BESS across Australia



Source: RenewMap, @gavinmooney

West Australia

17 November 2024 saw Western Australia's main electricity grid hit a new renewable energy record, with renewables peaking at 85.1% of energy on the South West Interconnected System (SWIS), and an average 46.5% renewables share for the November 2024 month.

The biggest threat to grid reliability is often thought to be a lack of supply at the times of peak demand, but the enormous growth of rooftop solar PV across Australia has led to a new challenge at the other end of the spectrum – not enough demand at times of peak supply. The arrival of big battery projects in the SWIS is already addressing one of the key vulnerabilities facing the country's, and the world's, biggest isolated grid – ever diminishing minimum demand levels. The first big battery to be connected to the SWIS, the 100MW /200MWh Kwinana stage 1 facility, is already addressing the issue, and this risk will be further reduced with the imminent commissioning of its bigger 200MW / 800MWh second stage Kwinana battery, and then Neoen's 560MW / 2,240MWh BESS in Collie, as well as the Collie BESS, which is due to come online in 2025.¹²⁶

West Australia – Collie BESS - Neoen

November 2024 saw the first stage of the Collie BESS, a 219MW / 877MWh by Neoen has enter operation, ahead of schedule. Phase 2 will see this BESS increase to 560MW / 2,240MWh, making it the biggest in the country, and one of the biggest in the world.¹²⁷

West Australia – Collie BESS - Synergy

October 2024 saw the first CATL battery units installed at Synergy's 500MW / 2,000MWh BESS under construction at Collie, with commissioning due in 2025.¹²⁸

It is worth noting the WA Government plans to close its last coal generators at Collie by the end of this decade. The federal Coalition says it wants to locate one its nuclear power plants at Collie to leverage the existing grid, seemingly ignoring the obvious point that the transmission capacity will be full, utilised by two of the world's largest (to-date) BESS which will both be operational by 2025, two decades before the Coalition's likely nuclear fantasy is proposed to be commissioned.

West Australia – Kwinana BESS - Synergy

November 2024 saw that building on the commissioning of the 100MW/200MWh first stage of its Kwinana BESS in 2023, Synergy has completed construction of the \$661m 200MW/800MWh second stage, with full commission due in 2025.¹²⁹

West Australia – Kemerton BESS - Trinasolar

December 2024 saw Perth council approve Trinasolar's proposed \$400m, 660MW / 2,640MWh BESS at the Kemerton Strategic Industrial Area, repurposing an end-of-life sand mining site. October 2024 saw the project given "critical project status" by Energy Policy WA and Western Power.¹³⁰

¹²⁶ RenewEconomy, [Big batteries have already put an end to minimum demand shocks in Australia's most vulnerable grid](#), 11 October 2024

¹²⁷ RenewEconomy, [First stage of Australia's biggest battery project switched on, well ahead of schedule](#), 29 October 2024

¹²⁸ RenewEconomy, [First units installed at Australia's first 2 GWh big battery project](#), 8 October 2024

¹²⁹ Synergy, [Kwinana battery complete as renewable energy records tumble](#), 27 November 2024

¹³⁰ WAtoday, [Big BESS: State's largest power bank to be built in WA's South West](#), 5 December 2024

West Australia – Wellesley BESS – Sunrise Energy

October 2024 saw Sunrise Energy announce a proposed \$200m 100MW / 400MWh BESS at Wellesley, WA.¹³¹

West Australia – Port Headland Solar & BESS – APA Group

December 2024 saw APA Group commission its cyclone resistant 45MW solar farm and a 37MW / 37MWh BESS at Port Headland in the Pilbara, WA. APA Group notes the “bundling” together of the supply sources to maximise the use of cheap and clean renewables – helping halve BHP’s reliance on diesel at this site. Similar projects under development include a wind farm at Newman and a wind and solar hybrid project at Chichester, in the Pilbara’s south.¹³²

¹³³ APA Group has a \$3bn portfolio of project proposals, building on its acquisition of \$1.72bn of Pilbara assets from Alinta Energy in August 2023.

West Australia – Cunderdin hybrid Solar & BESS – Global Power Generation (GPG)

December 2024 saw Global Power Generation (GPG), jointly owned by Spain’s Naturgy and the Kuwait Investment Authority, secure a \$2.3bn financing platform that will support the continued development of its 1.8GW portfolio of renewable energy and BESS assets in Australia.¹³⁴

December 2024 is expected to see GPG commission its Cunderdin hybrid 125MW solar and 55MW / 220MWh BESS project in West Australia, leveraging batteries from China’s Sungrow.¹³⁵

¹³¹ PV Magazine, [Sunrise Energy scores planning approval for 400 MWh WA battery](#), 21 October 2024

¹³² AFR, [APA plots path from gas to become a Pilbara solar and batteries giant](#), 3 December 2024

¹³³ APA Group, [Port Hedland Solar and Battery Project Factsheet](#)

¹³⁴ PV Magazine, [Naturgy lands \\$2.3 billion to boost Australian renewables portfolio](#), 4 December 2024

¹³⁵ RenewEconomy, [Spain’s Naturgy raises \\$2.3 billion for Australian renewables portfolio as new wind farm comes online](#), 4 December 2024

Other Recent Major Australian BESS Announcements

Victoria

Joel Joel BESS - ACEnergy

August 2024 saw ACEnergy's \$250m 350MW / 700MWh Joel Joel BESS given Victorian government approval after just nine weeks, under an accelerated Development Facilitation Program (DFP) launched by the Allan Labor government in March 2024, making proposed wind, solar and battery projects eligible for an accelerated development pathway.¹³⁶

Kiewa Valley BESS - Trinasolar

November 2024 saw Trinasolar submit its request for approval for its proposed 500MW / 1,000MWh BESS at Kiewa Valley, Victoria, and a 270 MW / 540 MWh Augusta BESS in Port Paterson, South Australia.¹³⁷

Latrobe Valley BESS – Tilt Renewables

November 2024 saw the Future Fund's mandate expanded with energy transition named a priority area for investment. The Future Fund owns 40% of Tilt Renewables, which has 1.8GW of solar, BESS and wind projects in various stages of operation, development or under construction. This includes constructing the 100MW / 200MWh (Stage 1) Latrobe Valley BESS at Morwell, Victoria.¹³⁸

Dederang BESS – Mint Renewables

November 2024 saw Mint Renewables submit its request for approval for its proposed 200MW / 400MWh BESS at Kiewa Valley, Victoria.¹³⁹

Renewable Energy Park Horsham – SEC & OX2

November 2024 saw the commencement of construction of the \$370m 119MW solar and 100MWh BESS Renewable Energy Park in Horsham, Victoria. The Victorian Government's SEC acquired the proposal from OX2 in September 2024.¹⁴⁰

Sweden's OX2 has an Australian project development portfolio at 3Q2024 consisted of 918MW solar power and 328MW BESS, located in Victoria, NSW and Queensland. OX2 recently acquired an early-stage onshore wind project in Western Australia with up to 1GW capacity and 100MW BESS.

Melbourne Renewable Energy Hub – SEC & Equis

November 2024 saw Victoria's SEC, in partnership with Equis Australia, reach half way in building out its \$1.2bn 600MW / 1600MWh BESS known as the Melbourne Renewable Energy Hub, with commissioning due late 2025. The SEC has invested \$245m in this project.¹⁴¹

¹³⁶ RenewEconomy, [Victoria's biggest battery becomes first project through new renewables fast track](#), 29 August 2024

¹³⁷ RenewEconomy, [Trina submits approval for Victoria big battery, as locals campaign against solar and storage projects](#), 29 November 2024

¹³⁸ PV Magazine, [Energy transition named priority area in new Future Fund's investment mandate](#), 21 November 2024

¹³⁹ The Weekly Times, [Kiewa Valley 400MW battery project application lodged](#), 7 November 2024

¹⁴⁰ OX2, [OX2 begins construction of 119 MW solar farm in Australia](#), 21 November 2024

¹⁴¹ SEC, [Melbourne Renewable Energy Hub](#), November 2024

Kiamil BESS – TotalEnergies

TotalEnergies also has a proposed 100MW / 380MWh BESS to be added to its 200MW Kiamil Solar Farm in Ouyen, Victoria (commissioned in 2021).

Tramway Road BESS – Eku Energy

November 2024 saw Macquarie Group’s Eku announce early stage plans to build the Tramway Road 300MW / 1,200MWh BESS in Gippsland, Victoria.¹⁴²

Rangebank BESS – Eku Energy

December 2024 saw Eku Energy commission ahead of schedule its 200MW / 400MWh Rangebank BESS in Melbourne, Victoria in partnership with Shell, taking 18 months for full construction to be completed.¹⁴³

Wooreen BESS - EnergyAustralia

September 2024 saw EnergyAustralia’s 350MW / 1,400MWh Wooreen BESS in the La Trobe Valley supported by the Federal Government’s first CIS Storage Tender.¹⁴⁴

Terang BESS - FRV

August 2024 saw FRV reach FID on its Terang 100MW / 200MWh BESS in southwest Victoria.¹⁴⁵

Gnarwarre BESS - FRV

August 2024 saw FRV state it was close to commencing construction of its 250MW / 500MWh Gnarwarre battery project near Geelong in Victoria.¹⁴⁶

Portland Energy Park BESS – Pacific Green

September 2024 saw UK storage firm Pacific Green seek approval under the EPBC Act for its 1,000MW / 2,500MWh Portland Energy Park BESS in Victoria in close proximity to the Portland aluminium refinery, with operations expected to commence 2027.¹⁴⁷ Pacific Green says it has a total of 10GWh of BESS proposals under development in Australia.¹⁴⁸

BESS – HMC Capital

December 2024 saw ASX-listed HMC Capital (AuM \$19bn) acquire Neoen Australia’s renewables and BESS portfolio (652MW operating, and a 2.8GW development pipeline) across Victoria for \$950m as part of the ACCC requirements to approve Canada’s Brookfield acquisition of France’s Neoen.¹⁴⁹ The 2.8GW development pipeline includes 1.5GW of wind and 1.3GW of BESS and include at various stages of development the Bulgana Battery Extension, Kentbruck Battery, Kentbruck Green Power Hub, Loy Yang Wind Farm, Moorabool Battery and Navarre Green Power Hub. The 652MW operating asset portfolio comprises the

¹⁴² Eku Energy, [Tramway Road Battery Energy Storage System](#), 4 November 2024

¹⁴³ Renew Economy, [Construction complete at Victoria’s second-biggest battery, contracted to Big Oil company](#), 3 December 2024

¹⁴⁴ EnergyAustralia, [A win for EnergyAustralia in energy transition](#), 4 September 2024

¹⁴⁵ FRV, [FRV Australia reaches FID for 100MW/200MWh Terang BESS project](#), 13 August 2024

¹⁴⁶ Australia NZ Infrastructure Pipeline, [Gnarwarre Battery](#)

¹⁴⁷ RenewEconomy, [One of Australia’s biggest battery projects seeks green tick for site next to giant Victoria smelter](#), 29 September 2024

¹⁴⁸ [Pacific Green](#)

¹⁴⁹ HMC Capital press release, [Strategic Acquisition of Neoen Victoria Portfolio](#), 5 December 2024

244MW Bulgana Green Power Hub, the \$128MW Numurkah Solar Farm, and the 300 MW / 450 MWh Victorian Big Battery near Geelong.¹⁵⁰

Bennetts Creek BESS – Flow Power

The December 2024 quarter saw Flow Power commence construction of its Bennetts Creek 100MW / 200MWh BESS at Hazelwood North, Victoria.

NSW

Stoney Creek BESS – Enervest and Energy Vault

October 2024 saw Swiss firm Energy Vault sign a \$350m agreement with Australian developer Enervest to deliver a 1GWh lithium BESS in Stoney Creek, NSW.¹⁵¹

Liddell BESS – AGL Energy

August 2024 saw AGL confirm construction of its 500MW / 1,000MWh Liddell BESS in the Hunter Valley, NSW.¹⁵²

Tomago BESS – AGL Energy

November 2024 saw the NSW Government approve AGL's proposed development of its \$1bn 500MW / 2,000MWh Tomago BESS to enhance the reliability of energy supply within the Hunter-Central Coast REZ.¹⁵³

Eraring BESS – Origin Energy

October 2024 saw Origin Energy commence construction of the stage 2 of its \$1bn Eraring BESS in NSW to take the combined project to 700MW / 2.1GWh total capacity.¹⁵⁴

November 2024 saw Origin Energy approve stage 3 to expand the Eraring BESS to 700MW / 2.8GWh total capacity, for full commissioning by 2027.¹⁵⁵

Richmond Valley BESS – Ark Energy

July 2024 saw Ark Energy submit its development plans to the NSW Government for its \$1.2bn 500MW solar farm and 275MW / 2,200MWh BESS at Myrtle Creek in northern NSW, supported by the December 2023 award of the NSW Round 3 tender. The lithium-iron phosphate battery would be one the largest BESS in Australia and quite possibly the largest eight hour lithium battery project in the world, so far.¹⁵⁶

¹⁵⁰ RenewEconomy, [Gillard-chaired fund snaps up Neoen's wind, solar and battery assets in Victoria in billion-dollar deal](#), 5 December 2024

¹⁵¹ PV Magazine, [1GWh battery announced for Stoney Creek NSW by Enervest and Energy Vault](#), 22 October 2024

¹⁵² AGL [FY2024 Results Investor Presentation](#), 14 August 2024

¹⁵³ NSW Government, [Approved \\$1 billion battery one of NSW's biggest](#), 23 November 2024

¹⁵⁴ RenewEconomy, [Origin begins construction of four-hour battery addition to help replace Australia's biggest coal generator](#), 30 October 2024

¹⁵⁵ PV Magazine, [Eraring battery third stage approval expands project to 700 MW / 2.8 GWh](#), 21 November 2024

¹⁵⁶ Energy Storage, [Ark Energy developing 2.2GWh, 8-hour BESS in Australia](#), 1 August 2024

Pinecrest BESS – Banpu Energy of Thailand

November 2024 saw Thailand's Banpu shelve a solar farm at Lithgow to solely proceed with its proposed 400MW / 800MWh BESS.¹⁵⁷

Limondale Solar & BESS – RWE

November 2024 saw Germany's RWE start construction of its 50MW / 400MWh BESS alongside its 249MW Limondale solar project completed in 2021. The BESS is due for commissioning in December 2025.¹⁵⁸

Gunning Solar & BESS – Canadian Solar

November 2024 saw Canadian Solar secure NSW Government approval for its A\$651m 250MW Gunning Solar farm and 150MW / 600MWh BESS in NSW.¹⁵⁹

Waratah Super Battery – Akaysha Energy

November 2024 saw Akaysha Energy's yet to be fully commissioned Waratah Super Battery of 850MW / 1680 MWh capacity used by AEMO under its reliability and emergency reserve trader mechanism (RERT) to ensure grid reliability in the face of five planned and unplanned coal-fired power plant unit outages at a time of extreme demand due to heatwaves.¹⁶⁰

Mt Piper BESS - EnergyAustralia

November 2024 saw EnergyAustralia's \$1bn 500MW / 2,000MWh Mt Piper BESS approved by the NSW government, with construction expected to commence in 2026. The Mt Piper coal fired power generator is currently due to close in 2040, making it the last one standing in what remains the country's biggest coal grid.¹⁶¹

Silver City CAES - Hydrostor

November 2024 saw Hydrostor sign a Crown Lands lease agreement with the NSW government to the develop its Silver City CAES 200MW of 8 hours duration at Broken Hill.¹⁶²

Homebush BESS - Transgrid

November 2024 saw Transgrid propose to build a 200MW / 400MWh BESS at Homebush in Sydney leveraging an existing Transgrid site with construction planned to start mid-2025.¹⁶³

Newcastle BESS - Transgrid

November 2024 saw Transgrid propose to build a 200MW / 400MWh BESS at Homebush in Sydney leveraging the existing Transgrid site, the Steel River industrial complex.

¹⁵⁷ RenewEconomy, [Developers quietly shed solar generation to focus on battery only projects](#), 3 November 2024

¹⁵⁸ ANZ Infrastructure Pipeline, [Limondale Solar and BESS](#)

¹⁵⁹ PV Magazine, [NSW set for 1.38 GWh more battery energy storage](#), 12 November 2024

¹⁶⁰ Renew Economy, [Australia's newest and biggest battery charged with surprise role in keeping lights on in NSW heatwave](#), 27 November 2024

¹⁶¹ RenewEconomy, [NSW gives planning approval for giant 2 GWh battery at site of state's likely last coal generator](#), 26 November 2024

¹⁶² [Hydrostor Inks Lease with NSW Government for Silver City Project in Step Toward Mini-Grid for Broken Hill Region](#), 8 November 2024

¹⁶³ RenewEconomy, [Ausgrid pitches its first big batteries for Newcastle and Sydney](#), 4 November 2024

Queensland

Blue Grass solar-BESS – Brookfield’s X-Elio

October 2024 saw Brookfield Renewables developer X-Elio announce it will add a 148 MW BESS over two stages to its operational 200MW Blue Grass solar farm in the Western Downs’ region of Queensland, marking its first hybrid solar + storage venture in Australia.¹⁶⁴

Sixteen Mile solar-BESS – Brookfield’s X-Elio

October 2024 saw X-Elio’s Sixteen Mile hybrid project involving a 350MW solar farm and 120MW / 240MWh BESS approved by the Australian government.¹⁶⁵

X-Elio is also developing a 300MW BESS project in South Burnett, Queensland, the 270MW Maxwell Downs Renewable Project, near Maxwell in NSW, which includes a 300 MW BESS and its \$185m 90MW Forest Glen Solar Farm and 25MW BESS near Dubbo, NSW.¹⁶⁶

Tarong Clean Energy Hub BESS – Stanwell Corp.

August 2024 saw Stanwell Corporation begin construction of its \$747m 300MW / 1,200MWh Stanwell BESS at Rockhampton.¹⁶⁷

Stanwell has also reached the halfway mark on another landmark project, the \$514m 300MW / 600 MWh Tarong BESS project.¹⁶⁸

Haughton Solar & BESS – China’s Pacific Blue

November 2024 saw China’s Pacific Blue (nee Pacific Hydro) gain Burdekin Shire Council planning approval for a A\$650m 300MW expansion of its existing 100MW Haughton Solar Farm, and for the addition of a 200MW / 400MWh BESS for a 2027 commissioning.¹⁶⁹

Beebo Solar & BESS – China’s Jinko Solar

December 2024 saw China’s Jinko Solar seek Federal Government EPBC approval for its 600MW Beebo Solar Farm, and associated 400MW / 800MWh BESS.¹⁷⁰

Ulinda Park BESS – Akaysha

November 2024 saw Akaysha reach FID and commence construction of its Phase 1 150MW / 300MWh Ulinda Park BESS project in Western Downs, Queensland.¹⁷¹

Cambridge Solar – Singapore’s Cambridge JMD Australia

October 2024 saw Singapore’s Cambridge JMD Australia gain Burdekin Shire Council planning approval for it’s proposed A\$2.4bn three-stage 1,065MW North Haughton Solar

¹⁶⁴ PV Magazine, [X-Elio to add 148 MW battery to Queensland solar farm](#), 22 October 2024

¹⁶⁵ PV Magazine, [Spanish developer gets federal go-ahead for 350MW solar farm in Queensland](#), 7 October 2024

¹⁶⁶ PV Magazine, [X-Elio strikes million-dollar deal with NSW council](#), 27 February 2024

¹⁶⁷ PV Magazine, [X-Elio to add 148 MW battery to Queensland solar farm](#), 22 October 2024

¹⁶⁸ Stanwell Corp, [Work on Stanwell’s mega battery projects power ahead](#), 15 August 2024

¹⁶⁹ PV Magazine, [Pacific Blue gets green light for 300 MW solar expansion and 400 MWh big battery](#), 13 November 2024

¹⁷⁰ PV Magazine, [Jinko seeks green tick for Queensland solar and storage project](#), 5 December 2024

¹⁷¹ Akaysha, [Ulinda Park BESS](#), 27 November 2024

Farm and BESS near Townsville for phase-1 commissioning end 2026.¹⁷² This proposal received environmental approval by the federal government in September 2024.¹⁷³

Townsville Polysilicon Plant BESS - Quinbrook Investment Partners

December 2024 saw Quinbrook Investment Partners add a 750MW BESS to its energy plans for its proposed \$8bn Townsville Polysilicon Plant.¹⁷⁴

Ganymirra & Majors Creek Solar Farms & BESS – Edify Energy

December 2024 saw Edify Energy’s Ganymirra 150MW Solar Farm and 600MWh BESS and the Majors Creek 1500MW Solar Farm and 600MWh BESS near Woodstock in Queensland selected under the CIS Generation tender.^{175 176}

Greenbank BESS – CS Energy

November 2024 saw Queensland SOE CS Energy’s \$300m Greenbank 200MW / 400MWh BESS progress towards its mid-2025 commissioning.¹⁷⁷

Woolooga BESS - Lightsource bp

December 2024 saw Rystad report that construction had commenced for Lightsource bp’s Woolooga 222MW / 640MWh Woolooga BESS at Lower Wonga in Queensland.¹⁷⁸

ACT

Williamsdale BESS – Eku Energy

November 2024 saw Eku Energy (jointly owned by Macquarie Group and British Columbia Investment Management Corporation) reach FID on the 250MW / 500MWh Williamsdale BESS in ACT and begin construction of this project, to be operational by 2026.¹⁷⁹

Eku Energy’s Australian projects include the 200MW / 400MWh Rangebank and 150MW / 150 MWh Hazelwood batteries in Victoria.

December 2024 saw Quinbrook Investment Partners’ Habitat Energy appointed to optimise this BESS performance.¹⁸⁰

Capital BESS - Neoen

April 2024 saw Neoen Australia’s 100MW / 200MWh Capital battery start the process of working through the commissioning process.¹⁸¹

¹⁷² PV Magazine, [North Queensland council provides approval for 1 GW multi-stage solar farm](#), 16 October 2024

¹⁷³ PV Magazine, [Queensland solar farm levels up with environmental approval](#), 19 September 2024

¹⁷⁴ RenewEconomy, [Quinbrook adds huge 750 MW battery to polysilicon plant sent for federal approval](#), 9 December 2024

¹⁷⁵ Minister Bowen press release, [Fixing Australia’s energy system now with new cheap, clean, reliable renewables](#), 11 December 2024

¹⁷⁶ [Ganymirra and Majors Creek Solar Power Station](#)

¹⁷⁷ CS Energy, [Greenbank Battery](#), November 2024

¹⁷⁸ Lightsource bp, [Australia: Lightsource bp reaches major milestone on solar and battery projects to deliver firm renewable energy solutions](#), 15 December 2024

¹⁷⁹ PV Magazine, [Eku Energy reaches financial close on 500 MWh ACT battery](#), 6 November 2024

¹⁸⁰ [Habitat Energy to optimise 250MW/500MWh Williamsdale battery on behalf of Eku Energy](#), 9 December 2024

¹⁸¹ RenewEconomy, [Capital battery finally charges up after nearly a year of commissioning delays](#), 10 April 2024

South Australia

Bungama BESS – Amp Energy

October 2024 saw Canada’s Amp Energy commence construction of its Bungama 150MW / 300MWh BESS at Port Pierre, South Australia as part of a wider \$2bn Renewable Energy Hub SA.¹⁸²

Blyth BESS – Neoen Australia

October 2024 saw Neoen Australia reach mechanical completion of its Blyth 238MW / 477MWh BESS in South Australia to help firm zero emissions energy supply for BHP’s Olympic Dam.¹⁸³

Hallett BESS - EnergyAustralia

September 2024 saw EnergyAustralia’s 50MW / 200MWh Hallett BESS (with plans to triple its capacity to 150MW / 600MWh down the track) located in Canowie, South Australia supported by the Federal Government CIS storage tender round 1.¹⁸⁴

Limestone Coast Energy Park BESS – Pacific Green

September 2024 saw UK storage firm Pacific Green named as a winner in the CIS storage tender for the majority of its 500MW / 1,500MWh Limestone Coast Energy Park BESS at Mingbool in South Australia (the CIS covers 250MW / 1,000MWh).¹⁸⁵

Solar River BESS – ZEN Energy Future

September 2024 saw ZEN Energy win the first CIS Storage Tender for its Clements Gap 170MW / 653MWh BESS at Warnes in South Australia, alongside its 250MW solar farm.¹⁸⁶

Clements Gap BESS – Pacific Blue

September 2024 saw China’s Pacific Blue win the first CIS Storage Tender for its Clements Gap 60MW / 143MWh BESS in South Australia.¹⁸⁷

Port Augusta CST - Vast Renewables

November 2024 saw Concentrated solar thermal (CST) specialist Vast Renewables sign an updated agreement to access up to \$30m of a \$65m funding deal with the Australian Renewable Energy Agency (ARENA) announced in early 2023. This supports Vast to build a 30MW / 288MWh CST plant near Port Augusta in South Australia. Construction is anticipated to begin in 2Q2025.¹⁸⁸

¹⁸² PV Magazine, [Construction begins on Australia’s fifth largest battery energy storage system](#), 18 October 2024

¹⁸³ RenewEconomy, [Origin begins construction of four-hour battery addition to help replace Australia’s biggest coal generator](#), 30 October 2024

¹⁸⁴ EnergyAustralia, [A win for EnergyAustralia in energy transition](#), 4 September 2024

¹⁸⁵ RenewEconomy, [One of Australia’s biggest battery projects seeks green tick for site next to giant Victoria smelter](#), 29 September 2024

¹⁸⁶ RenewEconomy, [Six new big battery projects emerge as winners of first capacity tender](#), 3 September 2024

¹⁸⁷ RenewEconomy, [Six new big battery projects emerge as winners of first capacity tender](#), 3 September 2024

¹⁸⁸ PV Magazine, [Vast unlocks funding to fuel CST power plant plans](#), 27 November 2024

Section 2.3 Building Momentum – PHS

Pumped Hydro Storage (PHS) will play an increasingly important role in Australia for seasonal storage and grid reliability, even as the short to medium duration storage market is going to be increasingly captured by BESS. This public insurance role is valuable, but makes private PHS commercially unbankable absent clear system value government financial underwriting.

NSW - Snowy Hydro's Snowy 2.0 Debacle

August 2024 saw Snowy Hydro announce it has acquired a fourth tunnel boring machine to get the \$12bn Snowy 2.0 2.2GW/350GWh debacle moving towards its official December 2028 completion timetable.¹⁸⁹

NSW – Muswellbrook – AGL Energy and Idemitsu

July 2024 saw AGL Energy and Idemitsu Australia's joint \$1bn 400MW of 8 hours duration Muswellbrook Pumped Hydro Project received a Critical State Significant Infrastructure declaration from the NSW Government, providing an acceleration pathway for this project with a target of FID in FY2026.¹⁹⁰

NSW Lake Lyell PHS - EnergyAustralia

September 2024 saw EnergyAustralia confirm its interest in developing its 335MW 8 hour duration Lake Lyell PHS proposal at Lithgow, NSW.¹⁹¹

Queensland - Borumba PHS – Queensland Hydro

November 2024 saw Queensland's new LNP government deliver on its election commitment to cancel the Pioneer-Burdekin PHS proposal, with the aim to replace that with a number of more distributed, smaller scale, faster to build PHS alternatives less prone to mega-project capital cost blowouts.¹⁹²

December 2024 saw Queensland's LNP reveal that the proposed \$14bn Borumba 2GW/48GWh PHS see a capital cost blowout to \$18bn and up to a three year delay, possibly putting the proposal at cancellation risk as well as the new Energy Minister David Janetzki flags interest in subsidising new gas peakers.¹⁹³

Queensland - Cressbrook PHS – Stanwell Corporation

October 2024 saw Stanwell Corporation acquire a stake in the proposed 400MW / 4GWh Cressbrook PHS near Toowoomba, been co-developed by BE Power and GE Renewables.¹⁹⁴

West Australia – Walpole PHS

¹⁸⁹ RenewEconomy, [Snowy buys extra boring machine to support “disappointing” Florence as testing unearths more problems](#), 26 August 2024

¹⁹⁰ AGL [FY2024 Results Investor Presentation](#), 14 August 2024

¹⁹¹ EnergyAustralia, [A win for EnergyAustralia in energy transition](#), 4 September 2024

¹⁹² RenewEconomy, [Queensland premier says costs of dumped Pioneer pumped hydro project blew out to \\$37 billion](#), 4 November 2024

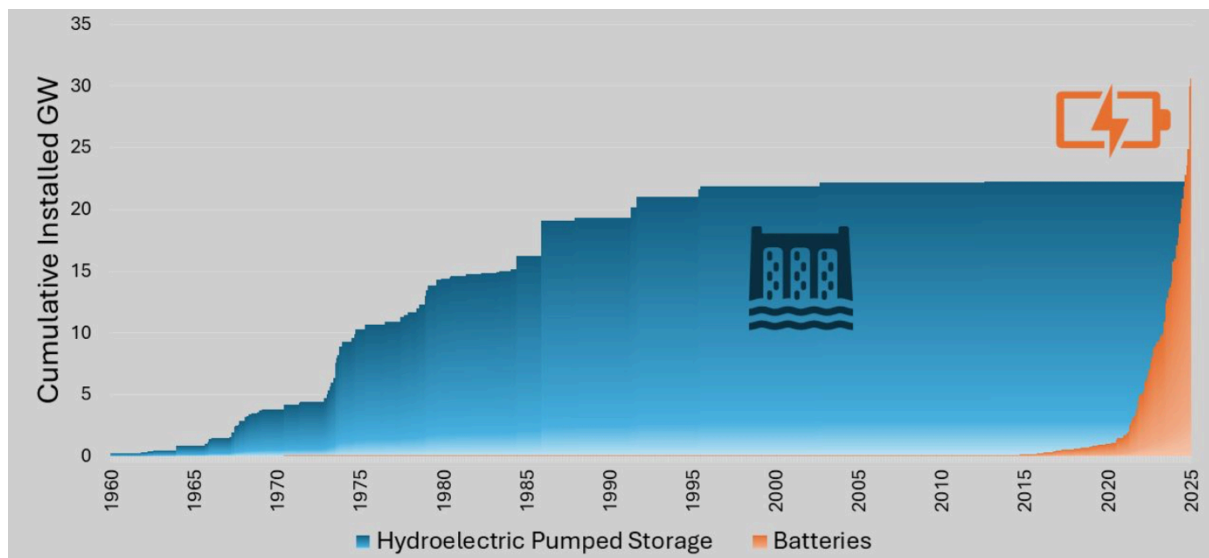
¹⁹³ RenewEconomy, [Queensland looks to gas and coal, hedges bets on nuclear as new cost blowout emerges for pumped hydro](#), 6 December 2024

¹⁹⁴ RenewEconomy, [Queensland coal giant adds pumped hydro to growing energy storage mix](#), 7 October 2024

December 2024 saw that after a two-year construction period, an Australian-first small-scale \$8m PHS project is ready to come online. The 30-MWh Walpole project is now waiting on Western Power to finalise grid connection to provide end-of-grid reliability.¹⁹⁵

In useful context for Australia, the US passed a major milestone in 2024 – the installed power capacity of BESS exceeded that of pumped hydro storage. According to the US EIA, batteries started 2024 at just under 16GW, boosted past the 23GW of PHS and is on track to reach 30GW by the end of 2024 – Figure 2.19.

Figure 2.19: US PHS vs BESS Installed Capacity (Cumulative GW)



Source: US Department of Energy, December 2024

¹⁹⁵ ABC News, [Pumped hydro project awaits grid connection to power Walpole during blackouts](#), 1 December 2024

Section 2.4 Building Momentum – CER

Consumer energy resources (CER) – led by rooftop solar, but increasing also including behind the meter batteries, EV, virtual power plants (VPP) and demand response management (DRM) tools are coming with the electrification of everything to play a key role in the deliverability of Australian Minister Chris Bowen’s 82% by 2030 target. Renew Australia for All calls on a \$5bn pa Federal Government financial support for accelerating this program, emphasising the need for programs to ensure all Australians to benefit.

Federal CER Roadmap

The July 2024 launch of the National CER Roadmap envisages a future where: “Consumer Energy Resources are an integral part of Australia’s secure, affordable and sustainable future electricity systems, delivering benefits and equitable outcomes to all consumers through efficient use which smooths the transition, rewards participation and lowers emissions.”¹⁹⁶

A clear opportunity to accelerate deployments of both generation and battery capacity while we wait for the build out of new grid transmission capacity, and to reduce the grid capacity expansion needs in aggregate and hence total cost to consumers, is the accelerated deployment of CER. This includes rooftop solar, behind the meter batteries, batteries-on-wheels and electrification of everything to allow progressive phase out of reliance on methane gas, and the double connection costs involved. This needs to be comprehensive, with solutions for both commercial and industrial (C&I) and residential, with the later including solutions for renters, apartments, social housing and those most impacted by energy affordability, with the least capital available to access otherwise commercially viable solutions.

October 2024 saw reports both major parties are drafting schemes to partly subsidise households to install batteries and rooftop solar panels ahead of the next federal election, which experts say could save bill payers up to \$1,000 a year in the face of the widespread cost-of-living crisis dominating community concerns, as highlighted by the Renew Australia for All campaign. This is a massive area of opportunity to accelerate electrification and decarbonisation across the entire Australian community, sharing the benefits will all, and building social licence and understanding in the process.¹⁹⁷

Consumer Energy Resources –Rooftop Solar

Australia already has over 3.8 million rooftop solar systems installed across Australia and their combined capacity is now larger than the capacity of the remaining coal generation fleet. Almost 100,000 have batteries installed, too.¹⁹⁸

October 2024 saw rooftop solar reaches stunning new record of 112.9% of South Australian state demand, with the state exporting 400MW of surplus power to Victoria.¹⁹⁹

¹⁹⁶ Energy and Climate Change Ministerial Council, [National CER Roadmap](#), July 2024

¹⁹⁷ Sydney Morning Herald, [Battery, solar schemes coming to zap household bills by up to \\$1000](#), 19 October 2024

¹⁹⁸ [AEMO CEO speech at Australian Energy Week 2024](#), 12 June 2024

¹⁹⁹ RenewEconomy, [Rooftop solar reaches stunning new record of 112.9% of SA demand](#), 19 October 2024

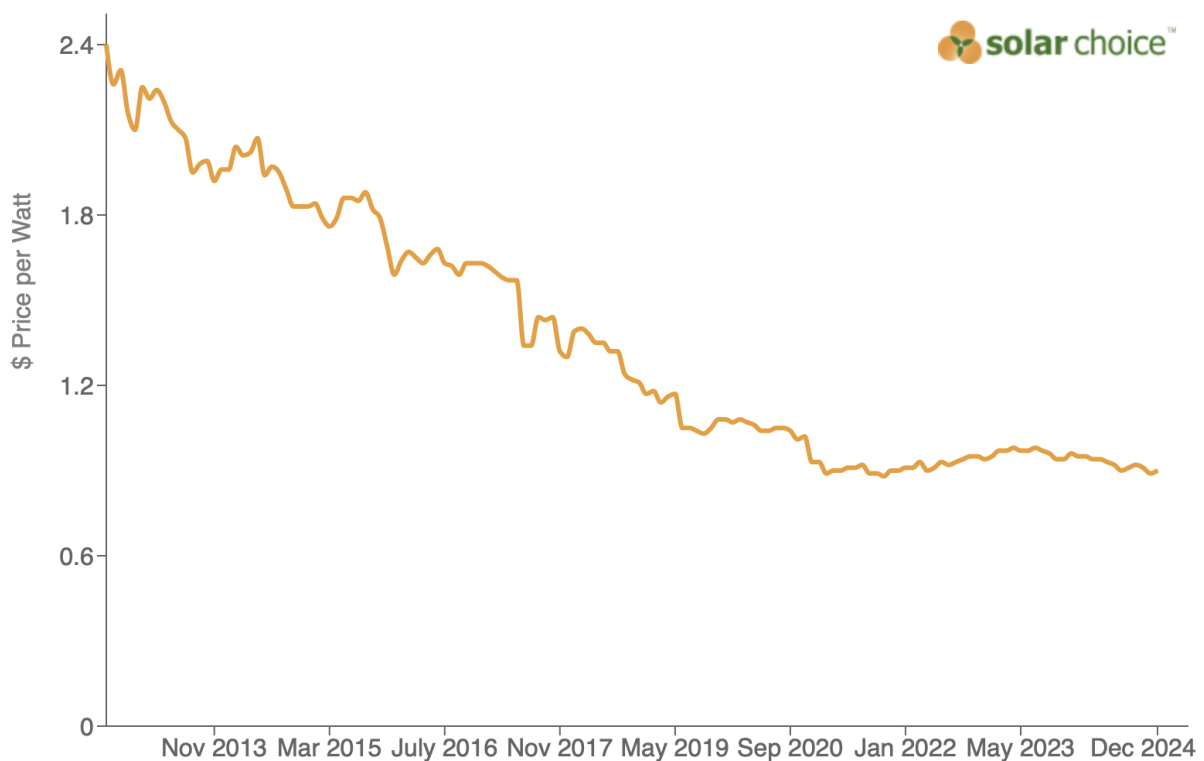
Year to date November 2024 rooftop solar has contributed 20TWh to the NEM, representing a share of 11.2% of total generation (up from just 6.4% in 2020) at an average cost to the grid of A\$31/MWh, 75% below the average wholesale cost of A\$123/MWh.²⁰⁰

The Clean Energy Regulator highlighted that 2.22GW of rooftop solar (<100kW) had been installed in the first nine months of 2024 across Australia, a run-rate of 3.01GW, the third highest level this decade, and only marginally below the 3.2GW record of 2021.²⁰¹

November 2024 saw Australia hit 4 million rooftop solar installations across the country. One in three Australian homes now have PV on their roof and the nation is on track for 3.15GW of new capacity to be added this year, taking the cumulative total past 25 GW.²⁰²

December 2024 saw AEMO’s first NEM transition to a renewables system security plan is future proofing the grid well ahead of a time when behind the meter rooftop solar will meet 100% of NEM demand, given the ongoing deflation of rooftop solar – Figure 2.20. Set as a goal between 2030 and 2035, the inaugural Transition Plan for System Security models 100% instantaneous rooftop solar generation, and the risks for the network reliability to ensure the capacity to use DRM, PHS, EVs and BESS to absorb this negative ongrid demand, leveraging the negative wholesale electricity prices that result.²⁰³

Figure 2.20: The Ongoing Deflation of Australian Residential Rooftop Solar (A\$/w)



Source: [Solar Choice](#), December 2024

²⁰⁰ [OpenElectricity](#)

²⁰¹ Clean Energy Regulator, [2024 shapes as a record-breaking year for renewable energy deployment](#), 28 November 2024

²⁰² PV Magazine, [Rooftop rollout drives impressive growth for Australian installers](#), 21 November 2024

²⁰³ PV Magazine, [100% of NEM demand met by rooftop solar on AEMO’s transition plan horizon](#), 5 December 2024

Climate and Energy Minister Chris Bowen acknowledged this milestone: “Aussie homeowners know rooftop solar is a no-brainer when it comes to bringing down bills, which is why we have been installing about 300,000 rooftop systems a year and there is no sign of that slowing down.” The continued momentum in rooftop solar uptake is driven by the Small-scale Renewable Energy Scheme (SRES) which cuts upfront installation costs by ~30%.²⁰⁴

The Australian PV Institute (APVI) estimates the total potential for rooftop solar in Australia to be 179GW (7 times current cumulative installs) and an annual energy output of 245TWh.

As per Section 1 above, the IEA Renewables 2024 report highlights the acceleration in progress in deployment of both renewables and heat solutions.

We note US rooftop solar installations cost about US\$4.20 per watt, significantly more than utility-scale solar, which costs around US\$1.16/w,²⁰⁵ and 5-6x the cost per watt for rooftop solar in Australia, highlighting why this technology makes so much commercial sense in Australia and why Australia continues to accelerate deployments even as we already have the highest penetration of rooftop solar per capita in the world.

²⁰⁴ PV Magazine, [Australia boasts 4 million rooftop solar installations with 25 GW capacity](#), 14 November 2024

²⁰⁵ Illuminem briefings, [Everyone loves rooftop solar panels. But there's a problem](#), 16 October 2024

Consumer Energy Resources – Beyond Rooftop Solar

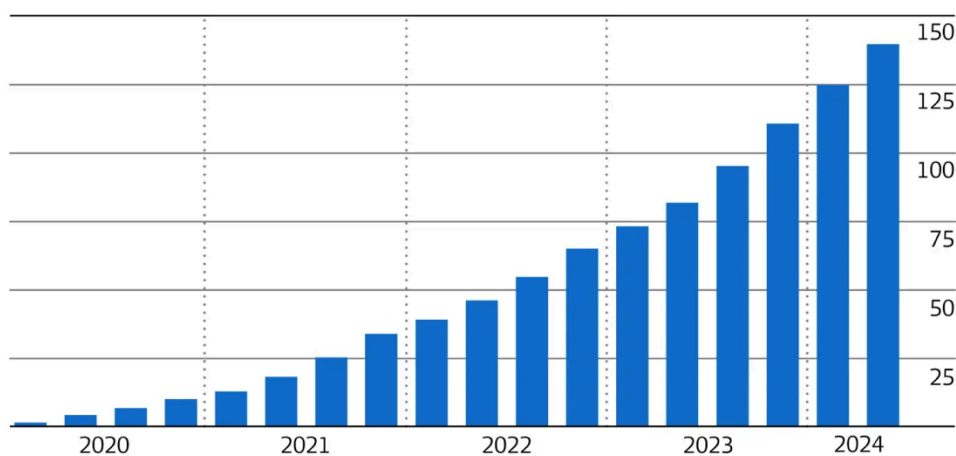
Consumer Energy Resources – Leveraging Rooftop Solar with BESS

November 2024 saw Nexa Advisory provide advice to the AEMO consultation on the 2026 ISP calling for a clearer view of distribution-scale and Consumer Energy Resource (CER) solutions, as well as getting AEMO to actually outline how the costs of both the proposed gas supply expansion, as well as the alternatives of stronger demand-side solutions, are identified and incorporated into the electricity market modelling.²⁰⁶

November 2024 saw Solar Citizens call on the Australian Government to establish a national battery rebate scheme targeting a million household and business battery installations by 2030. AEMO’s ISP models 8GW of battery storage needs by 2030, and all of this can be deployed rapidly at low cost in a distributed way to maximise the grid benefits. Solar Citizens concludes: “Rooftop solar combined with behind-the-meter battery storage ensures households have access to clean energy day and night and can save money on their electricity bills straight away and every day for years to come.”²⁰⁷ A NSW battery subsidy launched on 1 November 2024, ties in the state’s peak demand reduction scheme (PDRS) and installers must provide discounts based on conditional tradeable PDRS certificates.

The Climate Council tracks that almost 115,000 household battery systems have been installed across Australia, including over 21,000 units in 2024.²⁰⁸ Small-scale battery storage capacity jumped by 64% yoy in 2023, according to the Australian Energy Regulator, and capacity expanded a further 12% in the first half of 2024 – Figure 2.21.²⁰⁹

Figure 2.21: Australian behind the meter battery installations (‘000s)



Source: Clean Energy Regulator, CEC

Figure 2.22 shows the ramp in home battery deployments in the US, reaching 12.3% of new rooftop solar deployments. Woodmac forecasts this “residential attachment rate” is set to double to 25% in 2024, boosted by extreme weather grid outage rates, increased battery affordability and rising utility prices for energy, all improving the affordability of batteries.²¹⁰

²⁰⁶ Nexa Advisory, [Submission – AEMO ISP Methodology](#), 22 November 2024

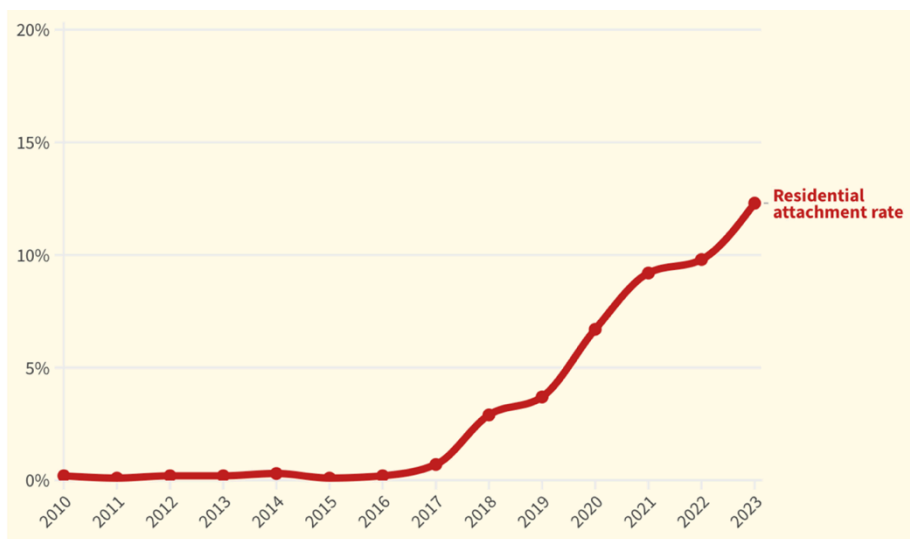
²⁰⁷ PV Magazine, [Call for federal battery storage rebate scheme targets a million installs by 2030](#), 20 November 2024

²⁰⁸ Climate Council, [Momentum Monitor](#)

²⁰⁹ AFR, [Where have the cowboy solar spruikers gone? Home battery storage](#), 24 November 2024

²¹⁰ Canary Media, [More and more rooftop solar buyers are adding home batteries](#), 4 October 2024

Figure 2.22: Percentage of US Buyers who Installed Batteries Alongside Rooftop Solar



Source: Lawrence Berkeley National Laboratory, 2024, via Canary Media

Consumer Energy Resources – Small Scale Commercial Solar & BESS

October 2024 saw an Essential Energy partner with Origin Energy in a trial in Armidale of 7 pole mounted batteries to better leverage rooftop solar. Other regional centres are also part of the trial. We question if the very small scale of this BESS is commercially viable, unless it is also linked into V2G EV charging infrastructure as an associated value-add.²¹¹

November 2024 saw London-headquartered investment firm VH Global Sustainable Energy Opportunities in collaboration with Melbourne-headquartered renewables investor Birdwood Energy complete the construction and commissioning of two solar and storage hybrid systems. The two 4.95 MW sites co-located with two DC-coupled, two-hour 4.95 MW BESS are in NSW, with a third online in 4QCY2024, and another 2 under construction.²¹²

November 2024 saw South Australia-headquartered Sustainable Energy Infrastructure (SEI) successfully complete three 5MW solar farms in regional NSW, Victoria, and South Australia in partnership with its EPC partner, Yates Electrical Services (YES) Group. SEI has four more 5MW solar farms in NSW waiting commencement, which are estimated to be completed in 2025, and seven BESS under construction in Victoria.²¹³

December 2024 saw Tokyo-headquartered renewable energy firm Bison Energy Australia win an EPC tender for two 5MW solar farm projects through a Victorian government tender for utility Goulburn Valley Water. Bison Energy Australia has 13 solar farms and BESS sites in various stages of development in South Australia, Victoria and NSW.²¹⁴

December 2024 saw electricity retailer Flow Power secure development approval for one of four identical 5MW solar and 15MWh BESS projects planned for South Australia.²¹⁵

²¹¹ Northern Daily Leader, [How public batteries are making homes mini solar farms](#), 10 October 2024

²¹² PV Magazine, [UK investment firm commissions 2 solar battery projects in NSW](#), 1 November 2024

²¹³ PV Magazine, [Three sub-5 MW solar farms completed and energised across three states](#), 22 November 2024

²¹⁴ PV Magazine, [Bison Energy to increase solar generation at Victorian water treatment plants](#), 6 December 2024

²¹⁵ PV Magazine, [New 5 MW solar and BESS project in South Australia is first of four to get green light](#), 6 December 2024

This leverages the fast regulatory approval opportunity for systems <5MW.

Consumer Energy Resources – Front Running & Optimising Grid T&D Buildouts

October 2024 saw an excellent paper by Prof. Paul Simshauser and Phillip Wild highlighting the minimum on-grid load issues from ever-higher solar power generation, concluding interstate grid transmission to export our way out of this issue is not a real solution given concurrent generation of solar in Eastern states, and the likely acceleration of end of life inflexible coal fired power plants. We are going to need to deploy batteries (utility scale, behind the meter and batteries-on-wheels) and DRM at a much faster rate, given the very slow lead-times to building PHS.²¹⁶

Heating hot water systems during the day is an obvious choice as a solar soaker.²¹⁷

Consumer Energy Resources – Virtual Power Plants (VPP)

Australian electricity retailers Origin Energy, AGL Energy and Engie Australia are leveraging the energy resources in customers' homes to manage peak demand fluctuations caused by intermittent solar power and unreliable coal power plants. By grouping thousands of customers as VPPs, gentailers can coordinate electricity supply from batteries, hot water systems and, increasingly, EVs to meet peak demand when other generation sources are in short supply. These gentailers "orchestrate" the CER in their VPPs, helping to change our electricity system to one of variable demand to accommodate variable, low emissions supply. As of August 2024, AGL has a VPP network of 1.25GW in generation assets, +10% yoy.²¹⁸ Engie Australia (previously Simply Energy) has 2,500 customers in its Australian VPP. As of June 2024 Origin Energy has 1,385MW connected to VPP (up from 815MW as at June 2023), and targets to growth this to 2GW by FY2026.²¹⁹

December 2024 saw Western Australia's clean energy solutions firm Plico twice activate its 2,500 home battery systems as a collective 27MW virtual power plant during recent heatwave warnings for the state, operating to stabilise the South West Interconnected System and prevent blackouts.²²⁰

Consumer Energy Resources – Vehicle to Grid Bi-Directional Charging

October 2024 also the launch of a 30 month research project by NRMA into bi-directional vehicle charging with the UTS and iMove Co-operative Research Centre. This V2G technology has been tested in Australia but its wider rollout has been delayed by government restrictions and a lack of compatible bi-directional chargers and vehicles. EV adoption will become for more attractive and valuable when EVs can be treated as batteries on wheels and can power the house, receive power from the house or charge the grid. A study by consultancy Energeia found EV connected to the electricity grid could earn their owners as much as \$12,000 a year in NSW. Amber Electric is also reported to be running a limited trial

²¹⁶ The Energy Journal, [Rooftop Solar PV, Coal Plant Inflexibility and the Minimum Load Problem](#), 25 October 2024

²¹⁷ The Conversation, [If our hot water heaters ran off daytime solar, we would slash emissions and soak up cheap energy](#), 14 November 2024

²¹⁸ AGL [FY2024 Results Investor Presentation](#), 14 August 2024

²¹⁹ Capital Brief, [AGL, Engie embrace VPPs to transform energy management](#), 11 October 2024

²²⁰ PV Magazine, [Plico virtual power plant activates 2,500 home batteries to counter WA heatwave](#), 13 December 2024

of V2G technology that will expand in the coming months with the installation of 50 bi-directional chargers in participants' homes.²²¹

October 2024 saw the opening up of the Adelaide to Melbourne route by the NRMA fast-charging EV network, supported by a \$39m government grant under the National EV Fast-Charging Network program.²²²

November 2024 saw speculation the first V2G chargers will be certified by mid-2025.²²³

Consumer Energy Resources – Remote Communities

The development of CER means isolated communities and end-of-grid consumers can more cost effectively be serviced with energy, with greatly improved energy reliability. This is a massive opportunity, particularly for First Nations communities, leveraging the lower cost and higher functionality of rooftop solar and batteries.²²⁴

November 2024 saw remote energy development specialist Pacific Energy commission a 24MW solar farm and 13MW BESS at the Tropicana gold mine, 330km northeast of Kalgoorlie, WA, jointly owned by Australian [resources companies](#) AngloGold Ashanti Australia and Regis Resources Ltd. This is expected to reduce diesel consumption by 96%.²²⁵

November 2024 saw Pacific Energy commission a sixth remote solar and BESS for Western Australian government's regional energy provider Horizon Energy as part of a \$15m government funding scheme to increase electrification and decarbonisation, and reduce Australia's energy security overreliance on imported, expensive high emissions diesel fuel.²²⁶

Consumer Energy Resources – Social Housing & Community Batteries

The Federal Government's Community Batteries for Household Solar program is rolling out 420 community batteries across the country. The first are planned for installation across metropolitan and regional South Australia, with the first two batteries seeing 600 eligible SA Housing Trust households that take part in the exclusive energy plan save ~\$550 a year through a retail tariff 25% below the Default Market Offer in SA. 10,000 SA Housing Trust tenants will ultimately benefit from the tariff reduction through community batteries. Work is underway to identify suitable sites across South Australia for more community batteries that have conditional approval granted and agreements pending with ARENA, which is delivering the \$200m Community Batteries for Household Solar program.²²⁷

As of November 2024, ARENA has contributed \$143m in funding to proponents \$216m funding to support deployment of 370 batteries across all states and the northern territory, totalling 281MWh of community-scale energy storage capacity.²²⁸

²²¹ The West Australian, [Park your car to power your home: study probes EV tech](#), 9 October 2024

²²² Federal Government Minister Chris Bowen, [Adelaide to Melbourne route connected with NRMA fast-charging EV stations](#), 30 October 2024

²²³ ABC, [V2G, which can turn EVs into giant home batteries, is coming in 2025](#), 15 November 2024

²²⁴ PV Magazine, [Traditional Owners seek to take control in energy shift](#), 12 October 2024

²²⁵ PV Magazine, [24 MW solar farm and 13 MW BESS powers up WA gold mine](#), 1 November 2024

²²⁶ PV Magazine, [Horizon Power solar and BESS projects free remote towns of diesel dependence](#), 13 November 2024

²²⁷ Federal Government Minister Chris Bowen and South Australian Energy Minister Tom Koutsantonis, [Investing in energy equity for South Australia](#), 30 October 2024

²²⁸ ARENA, [Community Battery Market Snapshot Report](#), 29 November 2024

Consumer Energy Resources – multi-tenanted buildings

December 2024 saw the CEFC provide a \$25m debt facility to electricity retailer Energy Locals and infrastructure fund Palisade Impact to finance the deployment of solar panels, battery systems, heat pumps and EV chargers multi-tenant buildings like apartments or aged care residencies.²²⁹ This is a key ask of the Renew Australia For All campaign, to ensure the whole Australian community is brought along in the energy system transformation, not just the wealthy, with the poor left carrying the cost.

Consumer Energy Resources – Household Energy Upgrades Fund (HEUF)

December 2024 saw the CEFC announce a fourth \$50m commitment to Bank Australia for energy performance upgrades of existing homes in expansion of the landmark Household Energy Upgrades Fund (HEUF) program to \$345m to-date. This allows Bank Australia to reduce its variable mortgage rate by 80bps for the first 5 years, allowing a home owner borrowing \$500,000 to save \$24,500 interest over a 30 year term. The loans are available for the purchase of a 7.5 star home, or for upgrading via the installation of rooftop solar, home batteries and energy efficiency equipment.²³⁰

Methane Gas Substitution Roadmap

CEF strongly advocates for the Federal Government to develop a residential methane gas substitution roadmap, leveraging the leadership of the ACT and Victorian state government. Even as the gas cartel restricts domestic gas supply to keep gas prices at international price parity and beyond, and greenwashes the high emissions profile and health dangers of methane gas use in our residential markets, the gas network operators are looking to further gouge domestic users of their monopoly legacy infrastructure by claiming consumers should pay even more for gas access. Given the fabricated domestic supply shortages constantly reported by the gas cartel, and parroted by AEMO – ignoring East Australia produces five times the gas that we consume domestically – the Australian and state governments should have a concerted plan to ban new residential methane connections and plan for an orderly phase out, consistent with the move to electrify everything. China is a decade ahead of Australia in this process, and it takes a clear long term plan to manage the transition fairly so those most vulnerable don't end up wearing even higher prices than the cartel is currently inflicting on them.²³¹

Consumer Energy Resources – Repurposed EV Batteries

November 2024 saw the commissioning in Texas of a the world's largest project of its kind, Element Energy's 53MWh storage project – consisting of 900 repurposed EV batteries. The startup is now looking to deploy its 2GWh second-life battery inventory on the back of a new partnership with LG Energy Solutions Vertech.²³²

CEF sees this a massive opportunity given Australia will soon have over 20 million batteries-on-wheels (otherwise more commonly termed EVs) on our roads, with a combined battery capacity approaching 1,000GWh. This represents a massive repurposing and then recycling challenge, and opportunity.

²²⁹ PV Magazine, [\\$25m clean energy fund accelerates multi-tenanted buildings transition](#), 5 Dec 2024

²³⁰ Bank Australia, [HEUF delivers green home loans for renovations with Bank Australia](#), 6 Dec 2024

²³¹ Renew Economy, [Death spiral: Network blows up renewable gas claims, wants to hit consumers for cost of stranded assets](#), 31 October 2024

²³² ESS News, [World's largest second-life battery storage project joins Texas grid](#), 22 November 2024

Section 2.5 Building Momentum – Grid

The social licence of grid transmission projects has been steadily eroded, undermining Australia’s delivery on its ambitious 82% renewables by 2030 target. As detailed in Section 2.2, BESS is providing a massive alternative path to ensuring grid reliability even as we accelerate the deployment of VRE. Batteries on wheels should likewise progressively reduce political and incumbent fossil fuel industry lobbyist fears over grid reliability as we accelerate the deployment of these newer technologies at speed and scale.

CEF is not an engineering expert, but we note ongoing reports that the deployment of existing, commercially viable technologies can potentially double the capacity of an existing transmission network, if all Grid Enhancing Technologies are deployed:

1. Reconductoring, or replacing just the wires on existing transmission towers, noting a 2024 US government report concludes: “Advanced transmission conductors are technologies that can be used to increase the pace of transmission capacity growth, at a lower cost and with less impact to communities than traditional conductors”;²³³
2. Dynamic line & transformer ratings, depending on temperature;
3. Power flow controller, devices installed on power lines can control the flow of power;
4. Topology optimization, reduces congestion by reconfiguring the transmission system to redirect power flow from congested facilities to uncongested facilities.

This can both allow the decarbonisation and capacity expansions to continue while we wait for new grid transmission projects to be approved, financed and built, as well as reduce the need for massive grid transmission projects entirely. In light of long delays and capex cost blowouts on new grid transmission projects relative to ongoing deflation in both rooftop solar and batteries, we need a comprehensive review to better understand the changing dynamics of new build vs existing upgrades vs batteries and CER vs energy efficiency.

October 2024 saw Australia’s NEARA raise \$45m of new series C private equity funding to develop its world-class grid transmission infrastructure enhancement technologies.²³⁴ CEF strongly endorses the use of AI and drone technologies to maximise the 24*7 utilisation of our existing A\$105bn of grid T&D whilst we wait for new grid transmission proposals to get approved, built and commissioned. So much of the existing pipeline of new firmed renewables capacity proposals could be commenced now, leveraging enhancing the existing capacity and the added benefit from the battery technology disruption. Neara describes its 3D digital modelling technology as enabling utilities to adopt a more proactive approach to network optimisation through simulations surfacing safety and reliability risks and identifying the most effective remediation actions.

November 2024 saw Transgrid sign its first non-network solution via a new contract with the 150MW / 300MWh Riverina and Darlington Point BESS in NSW to help boost the capacity utilisation on a heavily constrained part of the NSW grid, avoiding unnecessary capex and accelerating the deployment of new renewable energy capacity. Edify Energy CEO John Cole said that large-scale BESS are revolutionising the energy landscape by time-shifting power to provide grid stability and ensure clean energy is delivered at the lowest possible cost.²³⁵

²³³ Idaho US National Laboratory, [Advanced Conductor Scan Report: Summary](#), April 2024

²³⁴ AFR, [PE giant buys in as Aussie AI infrastructure start-up raises \\$45m](#), 31 October 2024

²³⁵ RenewEconomy, [“Beyond poles and wires:” Transgrid signs contract with big batteries to boost capacity on constrained grid](#), 21 November 2024

Project Energy Connect SA-NSW

Project Energy Connect is a two stage 800MW grid transmission project to connect Robertstown in South Australia 900km to Wagga Wagga in NSW. After delays, the project is due for full release of 800MW of commercial power in July 2027, after the expected December 2024 release of 150MW of power transfer capacity and will provide a major step up in interstate electricity transfer, particularly leveraging South Australia's world leading low cost, zero emissions but intermittent renewable energy.²³⁶

December 2024 saw SA Minister for Energy Tom Koutsantonis raise concerns over potential delays to the commissioning this month of the first stage of Project Energy Connect, and calling for the temporary restart of two mothballed diesel-powered electricity plants to ensure summer grid reliability in South Australia.²³⁷ Bizarrely this followed only a week after a November 2024 announcement by Transgrid that Project Energy Connect stage 1 had been successfully commissioned.²³⁸ CEF calls for accountability of grid network operators like Transgrid, who wear no material financial repercussions for failure to deliver on contractual commitments.

Humelink NSW

November 2024 saw the NSW government approve Transgrid's Humelink transmission project, which remains subject to the Commonwealth Government for final approval. The \$4.8bn project will provide a 365km renewable energy infrastructure spine across southern NSW and unlock the Snowy 2.0, to provide an additional 2,200MW of on-demand energy.²³⁹ Construction is due to commence late 2024 and completion by 2027.

Pilbara, WA – APA Group

December 2024 the WA government award APA Group priority status for the construction of two common user electricity transmission corridors – one from Port Hedland to Newman power station, and another north into the Burrup peninsula. Those corridors will connect several large renewable energy projects, connecting wind farms and providing a path for connecting to existing electricity networks. APA will also work with the WA State Government and the Clean Energy Finance Corporation to support the negotiation of an agreement for potential funding through the Rewiring the Nation (RTN) Fund.²⁴⁰

²³⁶ [Project Energy Connect](#)

²³⁷ AFR, [South Australia in urgent bid to restart diesel power plants](#), 1 December 2024

²³⁸ PV Magazine, [EnergyConnect transmission project reaches tri-state milestone](#), 27 November 2024

²³⁹ NSW Planning, [HumeLink transmission project receives tick of approval](#), 14 November 2024

²⁴⁰ APA Group Press Release, [APA Welcomes Priority Project Status for the Delivery of Common-use Electricity Transmission Infrastructure in the Pilbara](#), 3 December 2024

Section 2.6 Building Momentum – Offshore Wind

Offshore wind has become a political football, used by climate deniers to undermine Australia’s energy system transformation. Offshore wind will play an important role next decade as Australia accelerates the move beyond 82% renewables by 2030.

Australia has made progress in building out the pipeline of project proposals and approval process needed to establish a new offshore wind sector in Australia. This will be a key strategy to delivering on the move beyond 82% renewables post 2030, given the geographic and technology diversity this brings, and the higher capacity factors delivered by more consistent offshore wind. We note the progress made over 2024, but also recognise the financial challenges of establishing domestic Australian capacity, and the need for technology improvements and greater confirmation of the commercial viability of offshore wind in the Australian context, particularly for the far less developed floating offshore wind sector, which is the majority of Australian investor proposals.

November 2024 saw Victoria propose pared back plans to develop critical offshore wind port infrastructure in Victoria’s Western Port Bay through a state environmental assessment process, in a fresh bid to win a green tick from the federal Environment Minister Tanya Plibersek, who in January 2024 rejected this proposal for posing a “clearly unacceptable” environmental risk, centred around the impacts the proposed Victorian Renewable Energy Terminal would have on the internationally protected Western Port Ramsar wetlands. For Victoria, development of the terminal at the Port of Hastings is a key part of the state renewable energy plans, which includes offshore wind targets of at least 2GW by 2032, 4GW by 2035 and 9GW by 2040. It is the closest deep-water port to Australia’s first declared offshore wind development zone off the coast of Gippsland in Victoria’s south-east.²⁴¹

November 2024 saw the 2.2GW Star of the South proposal for Gippsland par back its number of turbines from 200 to 150, but also assume a significantly larger 15MW turbine, reflecting the major, ongoing global technology advances being seen in wind turbine scales. The turbine blades will also be higher, potentially materially reducing bird strikes. Star of the South is likely to be Australia’s first offshore wind farm.²⁴²

December 2024 has seen a continuation of the retreat from offshore wind farm development by the western oil and gas majors, with BP implicitly walking back from their 50GW of renewables by 2030 target as they spun off their 13GW offshore wind development pipeline into a new joint venture with Japan’s JERA, to be called Jera Nex bp.²⁴³ This follows the announcement by new CEO Wael Sawan in December 2024 that Shell will not initiate any new offshore wind projects.²⁴⁴ While disappointing, CEF notes the massive incumbent fossil fuel industry resistance to investing in disruptive new technologies or accepting and acting on the climate science.

²⁴¹ RenewEconomy, [Victoria dials back plans for offshore wind port, in fresh bid for federal green tick](#), 21 November 2024

²⁴² RenewEconomy, [Australia’s leading offshore wind project slashes turbine numbers and lifts blade gap to protect sea birds](#), 20 November 2024

²⁴³ FT, [BP moves offshore wind business into joint venture with Japan’s Jera](#), 9 December 2024

²⁴⁴ FT, [Shell signals no new offshore wind projects](#), 5 December 2024

CEF also notes that China is by far the world’s largest offshore wind developer globally, and 2024 has seen a massive scale and technology improvements, including launching prototypes of 25MW turbines and even a dual blade 35MW structure by China’s Sany.²⁴⁵

December 2024 saw the Federal Government declare a new offshore wind zone – the sixth to be officially declared in Australia – in the Bass Strait, which aims to support up to 20GW of renewable energy. Developers can apply for feasibility licenses for projects in this zone until March 2025, focusing on delivering economic and community benefits.²⁴⁶

December 2024 also saw Federal opposition leader Peter Dutton’s pledge to “rescind” the declared Hunter offshore wind zone off the coast NSW if elected in 2025, and sink the \$10bn plans for the 2GW project proposed for development there. The climate science denialism and misinformation being spread by the Federal LNP is undermining community confidence in the energy system transformation as well as that of global investors, given the sovereign risk such statements create.²⁴⁷

December 2024 saw China’s Alinta Energy shelve its WA offshore wind farm proposal, a direct example of the sovereign risk being created by the Federal LNP opposition.²⁴⁸

²⁴⁵ EVwind.es, [Chinese manufacturers unveil 27 new wind turbine models at China Wind Power](#), 28 October 2024

²⁴⁶ RenewEconomy, [Bowen declares new offshore wind zone capable of hosting 20 GW, despite being shrunk and pushed out to sea](#), 12 December 2024

²⁴⁷ RenewEconomy, [Peter Dutton vows to scrap offshore wind zone, “rip up contracts” and sink \\$10 billion project](#), 5 December 2024

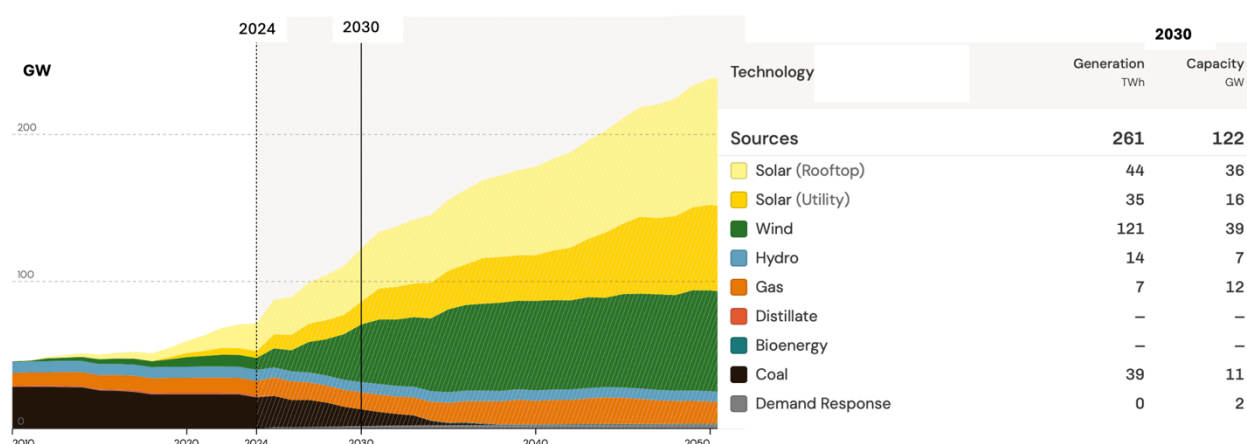
²⁴⁸ Daily Telegraph, [Alinta Energy quietly shelves WA offshore wind project as field of potential developer thins](#), 12 December 2024

Section 3. Building Momentum – Policy Process

2024 has seen strong progress in building the policy and regulatory support for the progressive electrification of everything and decarbonisation of the Australian economy. There have been many incremental steps forward that are collectively building momentum, despite fossil fuel incumbents and their climate science denier stooges continued noisy interventions.

The AEMO estimates in its Step Change Scenario that the NEM needs 55GW of grid-scale solar and wind generation capacity to be installed by 2030, in addition to the forecast 36GW of rooftop solar – a rise from the current capacity of 13GW and 19GW respectively – Figure 3.1. Whilst progress over 2024 has been made, planning and environmental approvals need to be accelerated and scaled as a priority, and the existing 24/7 grid capacity thoroughly re-evaluated in light of the enormous progress made in scaling the deployment of BESS across Australia.

Figure 3.1: Capacity - AEMO Step Change 2024, NEM (GW)



Source: AEMO Step Change Scenario, via Open Electricity, December 2024

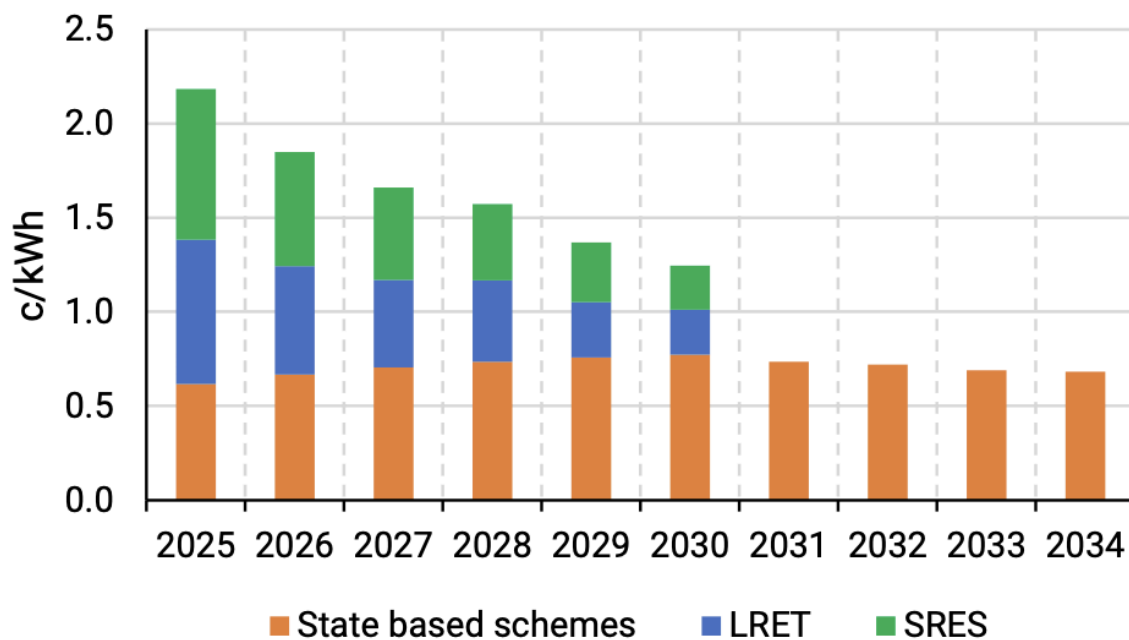
CEF views the issues of social licence to operate for renewable energy as over-hyped by the mainstream Australian media, and weaponised by certain political parties at the Federal level to serve the fossil fuel incumbents rather than the people and industries of Australia.

October 2024 saw a new study by Porter Novelli Australia and market research firm Quantum Market Research reveal that two-thirds (67%) of Australians, whether they live in cities or rural areas, are supportive of renewable energy projects. The report shows that lack of awareness and disinformation campaigns are key contributors to the perceived regional resistance of Australia’s efforts to reach net-zero.²⁴⁹ CEF would strongly advocate for regional communities to be given access to low cost electricity when new renewable energy projects are generating power in their region, to associate the solar and wind projects with affordable, zero emissions energy local supply, and encouraging local use when available.

²⁴⁹ PV Magazine, [Unplugging myths: Regional Australia’s real view on renewables](#), 31 October 2024

The AEMC details how renewable energy incentive scheme costs are set to drop by two-thirds post 2030 as the LRET and SRES incentive schemes come to end – Figure 3.2.

Figure 3.2: Renewable/Energy Efficiency Schemes costs Real Price \$FY25



Source: Australian Energy Market Commission, November 2024

We detail below the strong progress on decarbonisation and electrification in Australia over recent months. More is needed, but 2024 has been a year of accelerated momentum and deliver on great ambition to solve the concurrent energy, cost of living and climate crisis hitting Australians, and our industries reliant on affordable, reliable, progressively lower emissions energy supply. December 2024 saw ClimateWorks estimate that the combined the climate goals of state and territory governments to-date²⁵⁰ amount to a total emissions cut of 71% by 2035.

²⁵⁰ RenewEconomy, [State actions provide springboard for an ambitious 2035 emissions target consistent with 1.5°C](#), 12 December 2024

Section 3.1 Federal Government

Significant decarbonisation and electrification progress has been made under the Albanese Government, putting Australia on track for 82% renewables and 43% emissions reduction by 2030. The Capacity Investment Scheme (CIS), FMIA, Vehicle Emissions Standards and Safeguard Mechanism are compounding momentum.

Capacity Investment Scheme

Federal Energy Minister Chris Bowen's excellent CIS has a 32GW target made up of 23GW of renewable energy generation capacity, representing \$52bn in investment; and 9GW of clean dispatchable capacity (four-hour equivalent), representing a \$15bn in investment.

September 2024 saw the award of the first CIS storage tender to six BESS proposals across Victoria and South Australia. The tender was upgraded from the indicated 600MW of storage to 1,000MW / 3,600MWh.²⁵¹ The tender was massively over-subscribed at 19GW.

November 2024 saw the Australian government's CIS NEM Dispatchable Tender 3 open, seeking 4GW / 16GWh of dispatchable capacity for the National Electricity Market.²⁵² Projects will need to be operational by 31 December 2029, but in NSW, projects with a commercial operation date of 1 July 2027 or earlier will be "viewed more favourably", the tender guideline says. Registrations to bid close 11 December 2024 and successful bids will be announced in September 2025.

The CIS aims to promote local content, First Nations involvement and high quality community engagement criteria.^{253 254}

November 2024 saw a clear outworking of the lack of substance and action to build local content demand pull, with Australia's only remaining domestic wind turbine tower manufacturer, Keppel Prince, announcing it will mothball what remains of this part of its Victorian engineering business after fighting a losing battle to compete with cheaper Chinese wind tower imports.²⁵⁵

December 2024 saw the 6GW solar and wind CIS Tender 4 open for registrations even before Tender 1 has been awarded, with first round bids due February 2025.²⁵⁶ This tender may be upgraded to 10GW, a move we would entirely endorse.²⁵⁷

December 2024 saw Minister Bowen award 6.4GW across 19 wind and solar projects and 3.5GWh of associated BESS proposals in the CIS Generation Tender 1.^{258 259}

²⁵¹ RenewEconomy, [Six new big battery projects emerge as winners of first capacity tender](#), 3 September 2024

²⁵² AEMO, [Capacity Investment Scheme NEM Dispatchable](#), 13 November 2024

²⁵³ Australian Government, [CIS Tender 3: NEM – Dispatchable Capacity](#), November 2024

²⁵⁴ PV Magazine, [Third CIS tender seeks 4 GW / 16 GWh dispatchable capacity for the NEM](#), 14 November 2024

²⁵⁵ RenewEconomy, [Australia's only wind turbine tower maker to close shop. prompts Coalition to ignore its own history](#), 22 November 2024

²⁵⁶ AEMO Services, [CIS Tender 4 – NEM Generation](#), 13 December 2024

²⁵⁷ RenewEconomy, [Bowen says next round of CIS tenders will seek 10 gigawatts of wind, solar and battery storage](#), 21 October 2024

²⁵⁸ Government press release, [Fixing Australia's energy system now with new cheap, clean, reliable renewables](#), 11 December 2024

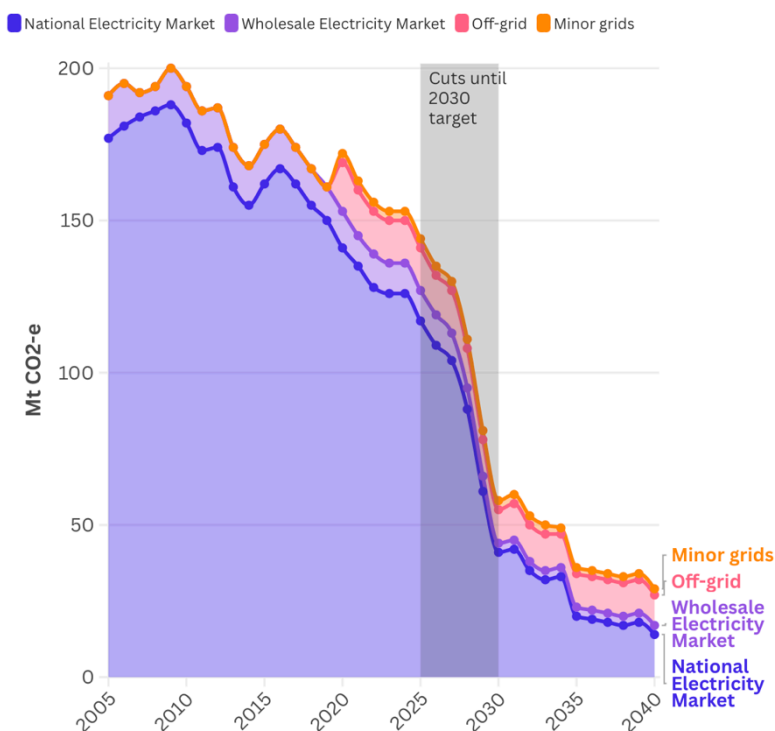
²⁵⁹ RenewEconomy, [NSW gets lion share as 19 solar, wind and hybrid projects win Australia's biggest renewable tender](#), 11 December 2024

43% Emissions Reduction by 2030 Target On Track

November 2024 saw the Climate Change Authority report in its third Annual Climate Change Statement that Australia is now on track to deliver on its 43% emissions reduction by 2030 target due to the acceleration of policies over the last year, including the CIS, the Future Made in Australia, the Safeguard Mechanism and the New Vehicle Efficiency Standard.²⁶⁰

The 82% renewables by 2030 target, the progressive electrification of everything and associated support of the CIS is critical to Australia's wider decarbonisation targets, as highlighted by Figure 3.3.²⁶¹

Figure 3.3: Projected emissions in electricity sector



Source: Climate Change Authority 2024 Annual Progress Report

Making Australia's regulatory energy framework fit for purpose

June 2024 saw the Clean Energy Investor Group (CEIG) highlight that slow planning and onerous environmental approvals are stymieing efforts to build enough green energy this decade, undermining the Federal Government's target of 82% renewables by 2030. CEIG states: "Securing environmental approval is becoming increasingly challenging, particularly for wind projects. While CEIG supports robust Environment Protection and Biodiversity Conservation assessments, the current administration of the EPBC Act remains a large issue for the energy sector."^{262 263}

²⁶⁰ Australian Government, [Annual Climate Change Statement 2024](#), 26 November 2024

²⁶¹ ABC, [These 6 charts tell of Australia's \(slow\) progress on climate change](#), 9 December 2024

²⁶² CEIG, [Response to NSW Government's consultation paper on the Long Duration Storage Review](#), 17 June 2024

²⁶³ The Australian, [Renewable energy target at risk as onshore wind farm endure onerous burdens, industry says](#), 14 June 2024

September 2024 saw Australia's Senate launch a Select Committee on Energy Planning and Regulation in Australia to inquire into and report on the institutional structures, governance, regulation, functions, and operation of the Australian energy market.²⁶⁴

October 2024 saw Environment Minister Tanya Plibersek approve Lightsource bp's new \$880m 450MW Goulburn River Solar Farm and a 49MW / 392MWh BESS in the Upper Hunter under the EPBC process. Since being elected, the Albanese Government has approved 63 renewable energy projects.²⁶⁵

October 2024 saw the Senate Select Committee on Energy Planning and Regulation's public hearing. CEF agrees with the CEIG recommendations that call for greater support for AEMO's Integrated System Plan (ISP) via stronger regulatory and policy frameworks to ensure the timely delivery of critical infrastructure, with Energy Ministers ultimately accountable for its timely implementation. Energy Ministers also need to clearly task market bodies with a forward-looking mandate that aligns with long-term investment signals and updated National Electricity Objective (NEO) emissions reduction goals, with regular reviews to keep their Terms of Reference fit-for-purpose in a high-VRE grid. A deep rethink of the NEM and associated governance frameworks is needed to align with the needs in the near future for a 100% decarbonised electricity system fit for consumers. CEIG recommends establishing an innovator and investor Panel, similar to Energy Consumers Australia (ECA), to provide formal guidance to AEMO on legislation and regulation. Given the \$100bn investment needed in grid and firm generation capacity across Australia this coming decade, CEF entirely agrees we need to make the electricity sector lower risk and more able to access debt, infrastructure, public and private equity at speed and scale.²⁶⁶

Climate Energy Finance has long questioned how AEMO can continue to work in the Australian public interest when it is 40% owned by the incumbent industry players mostly focussed on slowing the energy transition down, and/or lobbying for the inclusion of more subsidies for methane even as the methane gas cartel has priced gas out of the domestic market with its ongoing gouging, charging Australian industry and consumers 5 times the prevailing price of domestic methane gas in the UAE or US.

November 2024 saw the Australian Energy Regulator warn that the bidding behaviour of some incumbent electricity market oligopolists during high-price events is likely causing inefficiencies in the market and is not in the best interests of consumers, even if it is not "technically" against the rules. Use of unplanned "market" failures shows a clear pattern of rebidding to supply the same electricity but at the now peak price of A\$17,500/MWh.²⁶⁷

The alphabet soup of regulators, planning authorities and vested interest lobby groups clearly fails to look after the best interest of consumers. Accelerated informed planning approvals for firm renewables will widen the group of participants and drive new capacity, permanently lowering both the emissions profile and affordability of energy in the domestic Australian market. Failure to provide this will only underpin the deployment of CER that take the more wealthy customers out of the market as they invest behind the meter to protect

²⁶⁴ Parliament of Australia, [Select Committee on Energy Planning and Regulation in Australia](#), 16 September 2024

²⁶⁵ Federal Government, [New solar farm in NSW to power 191,000 homes](#), 7 October 2024

²⁶⁶ Clean Energy Investor Group, [Submission to Senate Select Committee on Energy Planning and Regulation](#), 18 October 2024

²⁶⁷ RenewEconomy, [Bad for consumers: Regulator pings generators and batteries for multiple "rebids" in high priced events](#), 22 November 2024

themselves, leaving the most vulnerable to wear the increased cost of a failure of market regulation.

October 2024 saw Nexa Advisory advise the Select Committee Energy Planning and Regulation calling for an independent review of the boards of the AER, AEMC, AEMO and Energy Consumer Australia to ensure alignment with the strategy, clarity of roles, that they have the right mix of skills and knowledge, and are appropriately independent and working in the best interests of Australian energy consumers.²⁶⁸ CEF entirely endorses this call.

November 2024 saw Climate and Energy Minister Chris Bowen take action to this end, appointing an expert independent panel of four to advise on an overhaul of the Australian electricity market. The panel will be led by expert energy economist Tim Nelson, alongside former AER chairwoman Paula Conboy, Ava Hancock, who advised then-NSW energy minister Matt Kean on the design of the NSW energy road map; and Phil Hirschhorn, a Boston Consulting Group partner. The reworked rules would aim to stimulate investment in both renewables and the firming capacity to support them when wind or solar generation is subdued and as coal plants shut. Chair Tim Nelson says: “The intent ... is to come up with a market framework longer term that does allow investors to lead that type of investment.”²⁶⁹

December 2024 saw the NEM Review announce commencement of an initial consultation.²⁷⁰

December 2024 saw the CEIG examine how significant EPBC Act delays exist for renewable energy projects, and recommend reforms to make the EPBC Act fit for purpose in delivering on the Government’s 82% renewables by 2030 target.²⁷¹

National Consumer Energy Resources (CER) Roadmap

December 2024 saw the Energy and Climate Change Ministerial Council acknowledge the increasingly important role CER is playing in delivering dispatchable capacity. Ministers maintain their focus on delivering for consumers and communities, and actions under the Roadmap will lower bills, improve access to CER and improving overall system operation. Ministers welcomed the initiative of the Australian Energy Regulator on policy led sandboxing to improve access and accelerate deployment and orchestration of CER/DER.²⁷²

October 2024 saw an update to the joint \$175m NSW Social Housing Energy Performance Initiative (SHEPI) to drive 24,000 energy efficient upgrades delivered by the Commonwealth and NSW Governments. Upgrades include new heat pump hot water heaters, solar sharing systems, ceiling insulation, electric stoves and split system air conditioners.²⁷³

November 2024 saw the Federal Government allocate another \$500m of funding for SHEPI, taking this to \$800m to-date, which is now expected to reach more than 100,000 social housing properties, which is sufficient to reach 25% of Australia’s social housing stock.²⁷⁴ As part of Renew Australia for All, CEF endorses this and calls on a \$5bn MEYFO allocation to accelerate the electrification of everything and ensure all Australians benefit.

²⁶⁸ Nexa Advisory, [Submission – Select Committee Energy Planning and Regulation](#), 20 Oct'2024

²⁶⁹ AFR, [‘Nothing’s off the table’: Expert panel to overhaul electricity market](#), 26 November 2024

²⁷⁰ Australian Government DCCEE, [NEM Review - Initial Consultation](#), 11 December 2024

²⁷¹ CEIG, [Delivering major clean energy projects](#), December 2024

²⁷² Energy and Climate Change Ministerial Council, [Communique](#), 6 December 2024

²⁷³ Federal Government release, [Cutting power bills for social housing tenants](#), 14 October 2024

²⁷⁴ Federal Government release, [Cutting power bills for social housing tenants](#), 30 November 2024

Future Made in Australia (FMIA)

November 2024 saw the Federal Government legislate the Future Made in Australia, supported by \$22.7bn in the 2024/25 Budget, includes a National Interest Framework, a robust sector assessment process, focussed on sensible Community Benefit Principles.²⁷⁵

The Future Fund Mandate

November 2024 saw Treasurer Jim Chalmers expand and enhance the Future Fund's mandate with energy transition named a priority area for investment. Chalmers states: "The government remains committed to the fund's independence and commercial focus. Its primary objective will continue to be to maximise returns... and there will be no change to the expected risk profile."²⁷⁶ The Future Fund owns 40% of Tilt Renewables, which has 1.8GW of solar, BESS and wind projects in various stages of operation, development or under construction. This includes constructing the 100MW / 200MWh (Stage 1) Latrobe Valley BESS at Morwell, Victoria.²⁷⁷

First Nations Strategy

December 2024 saw the Federal Government's release of its First Nations Clean Energy Strategy 2024-2030, which is focused on Aboriginal and Torres Strait Islander Australians sharing the benefits of the clean energy transformation through economic empowerment, self-determined participation and access to reliable and affordable renewable power, supported by the Commonwealth's \$70m commitment to implementing the Strategy.^{278 279} CEF applauds this progress.

December 2024 also saw the Federal Government launch the Torres Strait and Northern Peninsula Area Climate Resilience Grant Program to build climate resilience and address climate change impacts in the region, a \$16m investment over 6 years.²⁸⁰

²⁷⁵ Treasurer Jim Chalmers press release, [Future Made in Australia legislation passes the Senate](#), 29 November 2024

²⁷⁶ AFR, [Chalmers directs Future Fund to invest in housing and renewables](#), 20 November 2024

²⁷⁷ PV Magazine, [Energy transition named priority area in new Future Fund's investment mandate](#), 21 November 2024

²⁷⁸ Federal Government, [The First Nations Clean Energy Strategy 2024 – 2030](#), December 2024

²⁷⁹ RenewEconomy, [Energy ministers release strategy to give agency to First Nations in transition to renewables](#), 6 December 2024

²⁸⁰ Federal Government, [\\$15.9 million to support First Nations led climate action and education](#), 13 December 2024

Section 3.2 NSW Government

Failure to maintain momentum after the change of NSW government resulted in the need for taxpayers to extend yet another \$450m coal subsidy to Origin Energy, and a prolonged pause in new generation project approvals. However, progress over 2024 has accelerated, and the significant CIS wins for NSW put us on a much needed accelerating path towards 2030.

NSW Renewable Energy Proposal Approvals

NSW has suffered under a total incapacity to approve new renewable energy project proposals at anything like a credible speed and scale over the last decade, despite clear knowledge that the major coal fired power plants across NSW were rapidly approaching their end of life limits – refer Section 4.1.

December 2023 saw the Clean Energy Investor Group (CEIG) note this apathy had meant the average wind farm over the last five years to 2023 had taken 3,488 days to be approved, even when proposals had a State significant development (SSD) profile.²⁸¹

July 2024 saw Korea Zinc's Ark Energy pull its plans for its 430MW Doughboy wind farm near Armidale, saying the project was "no longer viable".

October 2024 saw RES Group formally inform federal regulators that it had withdrawn its proposal to develop the Barney's Reef wind farm north of Gulgong, citing: "This decision has been made in light of the changing economic and planning requirements for NSW wind farm development, which makes this project challenging for RES to proceed with at this time."

November 2024 saw the Minns Labor Government announce a new Renewable Energy Planning Framework to promote faster and more efficient planning decisions on high quality project proposals, provide investment certainty for industry and host communities, and boost economic benefits for regional communities.²⁸² NSW has closed a controversial loophole that allowed wind farm opponents to block new developments by lodging plans for "phantom dwellings" that might never be built, in key changes to the state's renewable energy planning rules.²⁸³

Since forming Government, the Minns Labor Government has now approved 30 renewable energy, BESS and transmission projects. These approvals will deliver 5.7 GW of new energy generation and 6.8 GW (and 17.4 GWh) of storage.²⁸⁴ In that time, the Government has declared six renewable energy projects Critical State Significant Infrastructure (CSSI).

August 2024 saw the Federal Government grant planning approval for the Central West Orana REZ transmission project following the NSW government approval in June 2024. This is the first Australian REZ to achieve this. The REZ is expected to drive up to \$20bn in private investment in solar, wind, and BESS projects.²⁸⁵ May 2024 saw NSW secure a \$490m investment in the Central-West Orana REZ from the CEFC.

²⁸¹ CEIG, [Delivering Major Clean Energy Projects in NSW](#), 14 December 2023

²⁸² NSW Government Media Release, [New Planning Framework to support NSW's clean energy future](#), 12 November 2024

²⁸³ RenewEconomy, [NSW secures another \\$4.2 billion of wind, solar and storage to help shift from coal](#), 18 December 2023

²⁸⁴ NSW Planning, [\\$1 billion battery approved to power 200,000 homes](#), 26 Nov 2024

²⁸⁵ NSW Planning, [Commonwealth planning approval secured for Australia's first REZ](#), 8 August 2024

NSW New Capacity Tenders

December 2023 saw NSW award \$4.2bn of new generation and firming investment projects in its Round 3 Tender, supporting projects by Squadron Energy, Neoen, Lighthouse bp, Ark Energy and A-CAES, including three eight-hour BESS systems.²⁸⁶

June 2024 saw NSW Government award 2 projects with total generation capacity of 312MW and 372MWh of BESS in AEMO Services' LTESA Round 4 Tender.²⁸⁷ This was a very disappointing outcome, suggesting the LTESA has been crowded out by the CIS tender, which is still outstanding five months later.

NSW Consumer Energy Strategy

September 2024 saw the NSW government has embraced CER as a key part of its 2030 Electricity Roadmap. The state's Consumer Energy Strategy targets "One million households and businesses to access a rooftop solar and battery system by 2030, rising to nearly 1.5 million by 2050."²⁸⁸ We applaud this strategy, but question why it has taken so long. Even the excellent behind the meter battery and VPP policy was announced, but had a six month delay so as to only take effect from November 2024, putting a six month freeze on activity as consumers waited to take advantage of the subsidy of up to \$2,400 per battery, plus up to \$400m to connect the battery to a VPP.²⁸⁹ Likewise, the \$239m new Home Energy Saver program with financial support targeted towards eligible households is excellent, but the sting is in the tail. The program will not be rolled out until the end of 2025.

The Consumer Energy Strategy comes on top of the \$200m to support the roll-out of public EV charging stations and \$175m to make energy savings upgrades for 24,000 social housing homes. Both excellent strategies that should be repeated annually for the next decade. It also introduces a new home energy ratings from 2025 so renters and buyers have more information about the cost of heating and cooling their potential homes.

November 2024 saw NSW Energy Minister Penny Sharpe legislate to raise NSW's long-duration energy storage target to 28 GWh by 2034, expanding on the 16GWh by 2030 target, with a provision to encourage local content requirements.^{290 291}

October 2024 saw NSW Energy Minister Penny Sharpe announce the rollout of 945 new EV charging ports at some 376 tourism spots across regional NSW, in the latest round of its \$20m EV Destination Charging grants program. The statewide EV program has seen 1,357 new chargers rolled out so far, helping accelerate the electrification of everything as part of a \$209m investment in NSW charging infrastructure, including \$10m to retrofit apartments with EV chargers and another \$3m for kerbside chargers.²⁹²

November 2024 saw the State government services and road agency Transport for NSW announce it is investigating the deployment of multiple 30 MW grid-scale battery energy

²⁸⁶ RenewEconomy, [Big win for wind industry as planning changes tighten rules on "phantom dwellings"](#), 12 November 2023

²⁸⁷ AEMO Services, [NSW Roadmap - Tender Round 4](#), 28 June 2024

²⁸⁸ NSW Government press release, [NSW Consumer Energy Strategy to save money and power across NSW](#), 16 September 2024

²⁸⁹ NSW Government press release, [Incentives for residential batteries](#), May 2024

²⁹⁰ NSW Government, [Energy Amendment \(Long Duration Storage and Investment\) Bill 2024](#), 21 November 2024

²⁹¹ PV Magazine, [NSW pumps up long-duration energy storage target to 28 GWh](#), 21 October 2024

²⁹² SMH, [The end of 'range anxiety'? NSW tourism hotspots go electric](#), 28 October 2024

storage systems to help decarbonise its Sydney heavy rail network for its zero emissions by 2035 target. CEF views this as an entirely logical network upgrade program.²⁹³

November 2024 saw the NSW government’s long delayed household and small business battery subsidy support scheme, including incentives for a 3 year DRM VPP contract.²⁹⁴

The NSW government is proposing to offer a 50% upfront subsidy for apartments and renters to install or access solar starting early 2025. Equity considerations are a key factor in this proposed new program, and CEF agrees this is a great way to build whole of community engagement and support for the necessary energy system transformation.

NSW Net Zero Target

November 2024 saw the new NSW Productivity and Equality Commissioner, Peter Achterstraat, highlight that NSW is not on track to meet its legislated net zero greenhouse gas emissions by 2050. In fact, we’re not even on track to meet our interim targets of 50% below 2005 levels by 2030 or 70% by 2035. Achterstraat noted the need for a whole of economy adoption of the Safeguard Mechanism (which only covers the top 219 carbon emitting facilities across Australia). Or for the states to step in and “price carbon” from sources not covered by the safeguard mechanism. All four remaining NSW coal generators are scheduled to close by 2040. Properly co-ordinating the rollout of utility-scale renewables, storage and consumer energy resources can score big, near-term emissions cuts. It’s also essential to keep the lights on. Beyond that, electrification is key. The longer we wait, the more it will cost to fix the emissions shortfall. CEF entirely agrees with the Commissioner.²⁹⁵

NSW Electricity Pricing Outlook is still Exceptionally High

December 2024 shows the forward pricing of wholesale electricity prices across the main NEM states for the next four years. Despite ongoing \$225m coal subsidies per year, NSW prices are 25-60% above neighbouring states, highlighting the critical need to accelerate the deployment of new firm replacement capacity at speed and scale - Figure 3.4.²⁹⁶

Figure 3.4: Projected emissions in electricity sector

	NSW	VIC	QLD	SA
2025	130.47	80.56	114.32	108.30
2026	121.50	73.56	102.90	102.66
2027	121.50	69.41	95.04	102.15
2028	123.00	70.85	95.00	98.94

Source: ASX Australian Electricity Market Wrap, 6 December 2024; prices for Calendar Year.

²⁹³ PV Magazine, [NSW transport service trains its sights on multiple 30 MW grid-scale batteries](#), 1 November 2024

²⁹⁴ NSW Government, [Sign your battery up to a Virtual Power Plant \(VPP\)](#), 1 November 2024

²⁹⁵ SMH, [NSW will miss its net zero target – unless we get our act together](#), 19 November 2024

²⁹⁶ ASX, [ASX Australian Electricity Market Wrap](#), 6 December 2024

Section 3.3 Victorian Government

Victoria has met every renewable energy and climate change target set to date and is on track for 95% by 2035. Its transition is supported by strong policy including accelerated approvals for renewables projects – with \$90bn worth of project investment value in the pipeline – incentives for accelerated deployments of distributed resources, including both C&I and residential (renters and apartments), and a strong legislated energy storage target of 6.3GW by 2035.

Since 2014, the Victorian Government has more than quadrupled the amount of power generated by wind farms and the share of electricity generated by renewables has increased from less than 10% to 39% in 2023. This is set to surge again with the October 2024 first power into the grid from the multi-phase 1.3GW Golden Plains Wind Farm due to be fully commissioned by 2027. This wind farm is supported by IKEA.

Victoria has met every renewable energy and climate change target set to date and is on track to hit 40% renewables by 2025 (reaching a record high 39.8% renewables share in the first 10 months of 2024), and 95% by 2035.

March 2024 saw the Allan Government announce that renewable energy projects will be eligible for an accelerated planning pathway under the Development Facilitation Program (DFP) – treating these projects the same as other significant works, noting that in Victoria there is currently \$90bn worth of investment value in renewable projects in the pipeline.²⁹⁷

October 2024 saw a move by the Victorian government to allow commercial solar system installations greater than 100 kW to access a decade's worth of Victorian energy efficiency certificates (VEEC) up front after the first year, based on greenhouse gas emissions reductions rather than power generated, a strong incentive to accelerate C&I deployments.²⁹⁸

Victoria has legislated its energy storage targets at least 2.6GW by 2030 and 6.3GW by 2035.

December 2024 saw Victoria's Solar for Apartments scheme (co-funded with the Federal Government) round two be extended, incentivising rooftop solar for apartments and renters. Round two includes units (which in Victoria are typically standalone dwellings, not multi-storey complexes) and townhouses, and if conditional eligibility criteria are met, can receive up to \$2,800 per lot or \$140,000 per property to install rooftop solar.²⁹⁹ This is a key example being called for by the Renew Australia for all campaign.

Section 3.4 Queensland

The newly elected LNP government in QLD, Australia's most emissions intensive state, has confirmed its commitment to reduce emissions by 75% by 2035, though has not released a plan for delivering this. With six coal power stations, QLD will be influential in Australia's coal power closure pathway. The LNP government has opposed nuclear, differentiating itself from its Federal counterparts. While it has cancelled the Pioneer-Burdekin pumped

²⁹⁷ Premier of Victoria, [Faster Approvals For More Jobs And Lower Power Prices](#), 14 March 2024

²⁹⁸ PV Magazine, [VEEC returns boost commercial solar investment](#), 17 October 2024

²⁹⁹ PV Magazine, [Victoria's solar for apartments scheme round two kicks off](#), 9 December 2024

hydro mega-project, it is sensibly replacing it with distributed, smaller, faster to build PHS alternatives less prone to capital cost blowouts.

Queensland is Australia's most emissions-intensive state. And the state government owns or part-owns six coal-fired power stations – so the new state government will have a major say over the trajectory of coal closure Australia-wide.

Despite Queensland's significant role in the Australian energy transition, the issues of energy, climate and the environment were noticeably absent from the broader narrative of election where crime, abortion and cost of living all received far more air time.

Partly this is because in April the state LNP offered bipartisan support for a legislated target to reduce emissions by 75% by 2035 but have not yet released a plan to show how they will achieve this. Incoming Treasurer David Janetzki reaffirmed commitment to the ERT.

The state LNP have also differentiated themselves from the federal Coalition by opposing nuclear power in Queensland.

New LNP Premier David Crisafulli signalled that he wants to make Queensland an “economic powerhouse” and attract investment. He committed to “do what we say we would do” and appeared to give a veiled warning to the right wing of the party, saying “this isn't America, we don't pander to extremes.” So a few positive signs there for those looking to keep the energy transition on track in Queensland.

Liberal National Party MP David Janetzki was appointed Energy Minister, alongside the role of Treasurer.

November 2024 saw the LNP deliver on their promise to cancel the Pioneer-Burdekin pumped hydro mega-project, where costs have reportedly blown out to \$20-37bn, with the aim to replace that with a number of more distributed, smaller scale, faster to build PHS alternatives less prone to mega-project capital cost blowouts.³⁰⁰ CEF sees this as a logical step, as we flagged in Matt Pollard's CEF report: “Queensland's Energy Transformation: From Coal Colossus to Renewable Energy Superpower”.³⁰¹

October 2024 saw Stanwell Corporation acquire a stake in the proposed Cressbrook PHS near Toowoomba, been co-developed by BE Power and GE Renewable energy, will generate 400MW of electricity for 10 hours per day, with plans to add a BESS of 200MWh.³⁰²

November 2024 saw the new Crisafulli Queensland government implement an ‘Electricity Maintenance Guarantee’ to commit to a five-year \$1.4 billion investment for maintenance of power plants and create a new framework around investment, performance, and accountability for Queensland power assets.³⁰³

³⁰⁰ RenewEconomy, [Queensland LNP names new energy minister, nixes massive pumped hydro project](#), 1 November 2024

³⁰¹ CEF, [Queensland's Energy Transformation: From Coal Colossus to Renewable Energy Superpower](#), 21 February 2024

³⁰² RenewEconomy, [Queensland coal giant adds pumped hydro to growing energy storage mix](#), 7 October 2024

³⁰³ Queensland Media Statement, [A Fresh Start for Queensland: Electricity Maintenance Guarantee to power Queensland's future](#), 28 November 2024

Section 3.5 South Australia

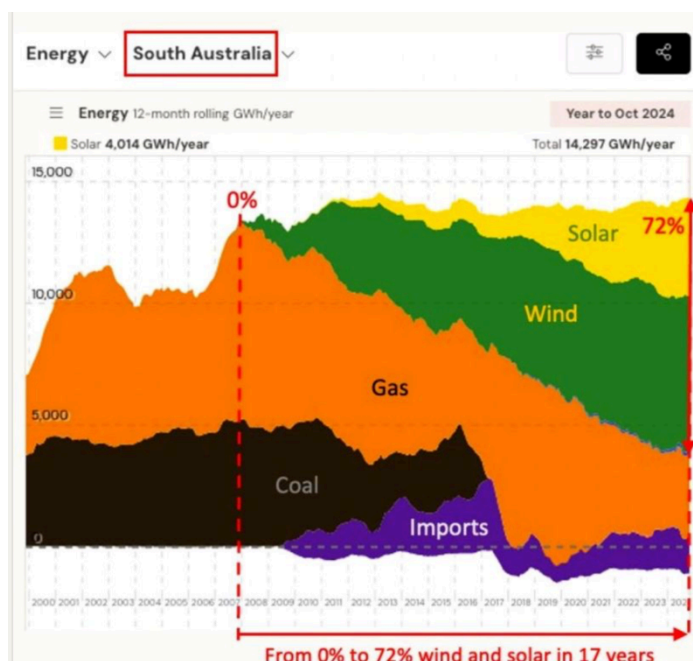
South Australia is a leader in renewable energy nationally and globally, with an average share of 72% renewables in the last 12 months, however the recent proposal for a new capacity payment scheme including existing and new fossil fuel generation is a massive regressive step.

November 2024 saw the incumbent fossil fuel industry yet again try to stick their snout in tax payer pockets as their political appointees in the South Australia state government propose to create a new capacity payment scheme that would include existing and future fossil fuel generators. This is the state that currently leads the country, and the world with an average share of >72% renewables (wind and solar) over the last 12 months, and has recently accelerated its renewables target to 100% net by 2027, enhanced by its CIS auction win this month – a target entirely on track – Figure 3.5.³⁰⁴

The Smart Energy Council’s CEO John Grimes nails it in response: “South Australia has been a leader in renewables, but this is a step backwards for the state. The world is moving in one direction towards clean energy, it doesn’t make sense to build our future grid with last centuries technology – gas.”³⁰⁵

Incumbent industry players like Origin Energy CEO Frank Calabria have been calling for more methane gas power plant subsidies even as Origin reports record high profits, \$1,397m in FY2024.³⁰⁶

Figure 3.5: South Australia Set to Move from 0% to 100% Renewable Energy in 20 Years



Source: Open Electricity, @gavinmooney, November 2024

³⁰⁴ Renew Economy, CIS auction wins ensure South Australia will be first grid in world to reach 100 pct net wind and solar, 11 December 2024.

³⁰⁵ RenewEconomy, [Gas lobby hoorays South Australia capacity payment plan as clean energy industry fears backward step](#), 22 November 2024

³⁰⁶ ABC, [Origin boss says the energy market is no longer fit-for-purpose and needs an overhaul](#), 18 November 2024

Section 3.6 West Australia

In WA, the historical coal heartland of Collie is being transformed by mega BESS projects, as even climate denialist Hancock Prospecting pivots to solar to power iron ore processing and the state energy minister signals the need for increased urgency in firmed renewables approvals processes.

October 2024 saw the first units of Synergy's 2GWh BESS at Collie installed, whilst a second even larger 560 MW / 2240 MWh BESS is being built by Neoen at Collie. This follows WA State Government allocating \$134m in funding from its Collie Industrial Transition Fund to help fast-track large-scale projects in Collie, historically the state's source of thermal coal and coal fired power.³⁰⁷

October 2024 saw the addition of a solar farm proposal in a revised application for Hancock Prospecting's Mulga Downs iron ore project in the Pilbara to the state's Environment Protection Authority. Possibly a sign that even climate science deniers are willing to pivot when the economics are so supportive, and both financiers and customers are demanding a path to decarbonisation.³⁰⁸

2024 has seen efforts by the WA Energy and Environment Minister Reece Whitby to implement the findings of the late 2023 Vogel-McFerran Report findings to inject urgency to the approvals process, talking about the required change of culture in the approval agencies given the need for scale and speed of evaluation: "Coming down the road is a tsunami of new projects inspired by green energy."³⁰⁹

Section 3.7 Tasmania

January 2024 saw the Tasmanian Government commit to upgrading the approval pathway for major renewable energy projects as an outcome of work completed under the Government's Renewable Energy Coordination Framework.³¹⁰

³⁰⁷ RenewEconomy, [First units installed at Australia's first 2 GWh big battery project](#), 8 October 2024

³⁰⁸ RenewEconomy, [Gina Rinehart to build "eye sore" solar farm on family property to help power new iron ore project](#), 9 October 2024

³⁰⁹ Boiling Cold, [Whitby lauds new blood to speed WA environmental approvals](#), 6 December 2024

³¹⁰ Renewables, Climate and Future Industries, Tasmania, [Renewable energy approval pathway](#), 24 January 2024

Section 4. Coal Fired Power Plant Closures

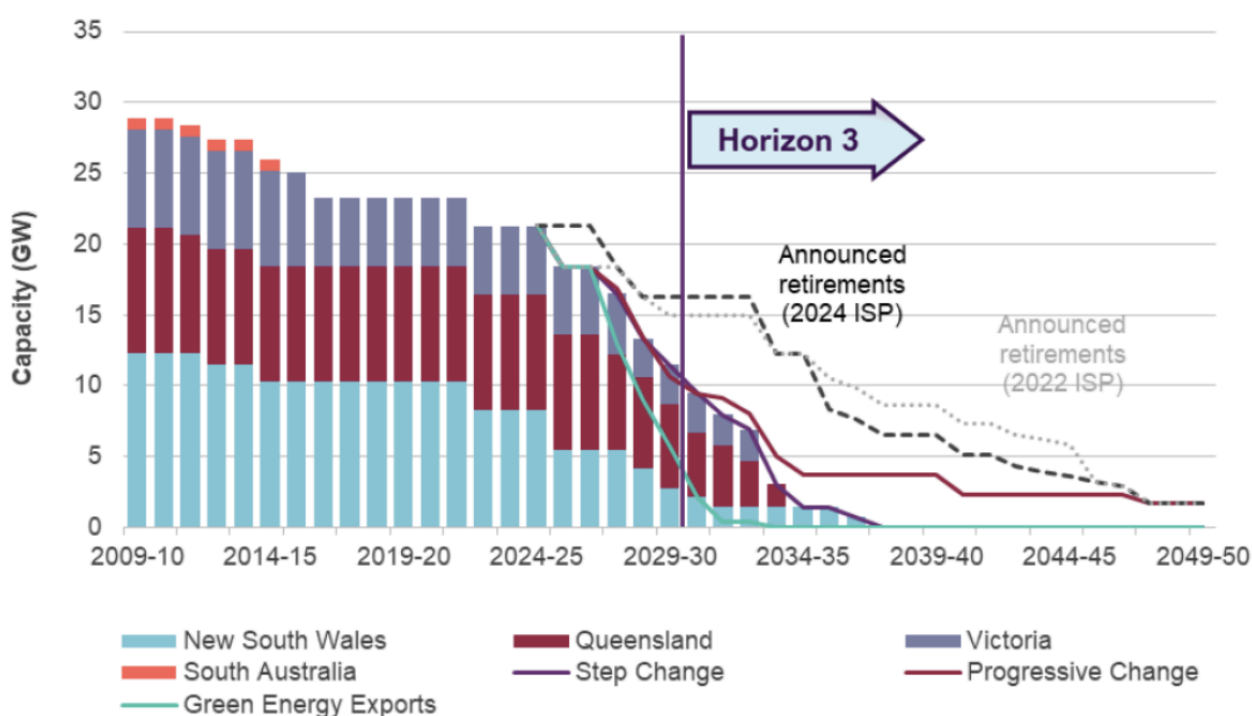
The long known approaching end of life of Australia’s high emissions, increasingly unreliable coal plant clunkers necessitates an accelerated and scaled deployment of replacement capacity, a process that should have commenced several years ago. Almost all Australian coal clunkers will close in the next decade or so, and grid reliability will continue to be undermined by planned and unplanned coal plant outages, particularly during periods of high demand resulting from high temperatures.

Post the closure of AGL Energy’s Liddell coal fired power plant in NSW in April 2023, progress on end of life coal plant closures is being hampered by the failure of Origin Energy, AGL Energy, Snowy Hydro or Alinta to build replacement energy capacity ahead of well documented closure schedules.³¹¹ It is pleasing to see AGL step up investment expectations in replacement capacity in 2024, but this should have been undertaken years ago, but investor confidence was clearly undermined by the now Federal Opposition’s ongoing attempts to sow discord and disinformation and maintain the climate wars.

November 2024 saw AEMO warned yet again on the increasing unreliability of aging subsidised coal fired power plants across Australia, concluding new renewable energy and BESS deployments are reducing the risks of unplanned coal outages.³¹²

December 2024 saw AEMO highlight the rising risk of minimum on grid demand as further undermining the viability of inflexible coal fired power plant clunkers – Figure 4.1.³¹³

Figure 4.1: Coal Capacity in the NEM, FY2010-FY2050



Source: AEMO, December 2024

³¹¹ AFR, [AGL flagged closing Liddell years ago. Why it wasn't enough time](#), 17 April 2023

³¹² AEMO, [2024/25 Summer Readiness](#), 14 November 2024

³¹³ AEMO, [2024 Transition Plan for System Security](#), December 2024

November 2024 saw Squadron Energy state: “AEMO has confirmed that the combination of high temperatures across NSW and Queensland along with coal plant outages will cause tight electricity supply forecasts in the coming days. We know that Australia’s coal fleet is nearing the end of its economic and technical lifespan with coal plant outages driving high price periods. Coal is killing affordability and reliability. Renewables are the answer.”³¹⁴

Vales Point – NSW - Sev.en Global Investments

July 2023 saw Delta advise AEMO it was considering to extend the life of Vales Point four years from 2029 to 2033.³¹⁵

October 2024 saw Czech firm Sev.en Global Investments’ Delta Electricity, operator of the 1,320MW Vales Point generator on the NSW Central Coast, disclose it was unable to get credit support in the form of a bank guarantee.³¹⁶ Global finance is clearly progressing pledges to phase out capital supply to fossil fuels, with coal the first to see the full impacts of this.

December 2024 saw the NSW Environment Protection Authority launch prosecution proceedings against Delta Electricity for causing the discharge of concentrated sodium hypochlorite into waters leading to Lake Macquarie, a reminder of the massive ongoing and growing environmental costs externalised onto everyone by these end of life coal clunkers.³¹⁷

Eraring – NSW – Origin Energy

The 2,880MW gross coal fired power plant’s closure has been extended by 2-4 years, supported by up to another \$450m of coal subsidies imposed by NSW Premier Chris Minns in August 2024.³¹⁸

December 2024 saw Origin warn that Eraring would continue at reduced capacity due to outages, despite extreme weather increasing demand.³¹⁹

Bayswater – NSW – AGL Energy

October 2024 saw AGL Energy trialling operating the 2,715MW Bayswater coal fired power plant flexibly, so as to ensure it can survive periods of low ongrid demand and the resulting negative power prices as the baseload power demand concept is consigned to history.³²⁰ Commissioned in 1985, is scheduled to close between 2030 and 2033, in line with AGL’s Climate Transition Action Plan.³²¹

³¹⁴ Squadron Energy, [Latest warning from AEMO demonstrates the urgent need to replace Australia’s ageing coal fleet](#), 25 November 2024

³¹⁵ AFR, [Coal power lifeline for NSW power grid](#), 14 July 2023

³¹⁶ AFR, [Cashed-up NSW coal power owner jilted by banks](#), October 2024

³¹⁷ Newcastle Herald, [Power station owner to stand trial for killing thousands of fish in Lake Macquarie](#), 2 December 2024

³¹⁸ RenewEconomy, [NSW confirms Eraring closure delay driven by fear of pre-election price shocks](#), 6 August 2024

³¹⁹ The Australian, [NSW’s largest coal power station suffers fresh delays ahead of hot weather return](#), 4 December 2024

³²⁰ ABC, [Australian coal plant in 'extraordinary' survival experiment as solar funding woes stalk industry](#), 13 October 2024

³²¹ AGL Energy, [Bayswater Power Station](#)

Mt Piper – NSW –EnergyAustralia

August 2023 saw EnergyAustralia’s climate plan review it plans to keep the 1.4GW Mt Piper coal fired power plant running until 2040, almost a decade beyond the average coal fired power plant closure age, but operating it progressively more flexibly and relegating it to “a reserve role” on the grid, potentially as soon as the early 2030s.³²²

Loy Yang B - Victoria – Alinta Energy

China owned Alinta Energy’s 1140MW lignite fired power plant has a formal closure date slated for 2047.

Collie – West Australia – Synergy

Western Australia's State-owned coal power stations will be retired by 2030. Synergy’s 350MW Collie Power Station is scheduled to close in 2027 and 455MW Muja D in 2029. This follows the previously announced Muja C 200MW Unit 5 closure in 2023 and the 200MW Unit 6 scheduled for 2025.³²³ The WA Government has established a \$547m package to help pivot the regional community and secure new industrial projects and create jobs in Collie.³²⁴

Section 4.1 Coal Power’s Increasing Unreliability

The increasing unreliability of end of life coal fired power plants and threat to the NEM is increasingly problematic for AEMO. The good news is that the massive scaling up of BESS is providing the firming the grid needs to deliver reliability, as well as affordability, both in times of peak and minimum on-grid demand.

NSW Grid Reliability Threat – November 2024

November 2024 saw Akaysha Energy’s yet to be fully commissioned Waratah Super Battery of 850MW / 1680 MWh capacity, coupled with Iberdrola’s Wallgrove BESS and 75MW of demand response capacity through Enel X plus a curtailment of production at Tomago Aluminium smelter, used by AEMO under its reliability and emergency reserve trader mechanism (RERT) to ensure grid reliability in the face of five planned and unplanned coal- and methane gas-fired power plant unit outages at a time of extreme demand due to unseasonally hot temperatures.^{325 326}

November 2024 saw ex-NSW Energy Minister Matt Kean make the argument very clearly that the argument against clean energy is an argument for more blackouts as replacement capacity for end of life coal fired power plants is withheld from being delivered at the speed and scale required. CEF agrees entirely.³²⁷

³²² RenewEconomy, [EnergyAustralia won’t retire Mt Piper coal before 2040, but may run it like a battery](#), 21 August 2023

³²³ Synergy, [State-owned coal power stations to be retired by 2030](#), 14 June 2022

³²⁴ WA Government, [State-owned coal power stations to be retired by 2030 with move towards renewable energy](#), 17 August 2023

³²⁵ RenewEconomy, [Australia’s newest and biggest battery charged with surprise role in keeping lights on in NSW heatwave](#), 27 November 2024

³²⁶ ABC, [NSW’s energy supply is 'extremely tight'. Here's how another heatwave could tip it over the edge](#), 29 November 2024

³²⁷ AFR, [The argument against clean energy is an argument for more blackouts](#), 28 November 2024

Section 4.2 Methane Peakers

Climate luddites and fossil fuel lobbyists will continue to push methane gas as a long term bridging fuel. However, the rapid ongoing scaling up of BESS deployments, underpinned by ongoing BESS deflation, continues to erode the commercial viability of methane gas peakers, particularly in Australia where the gas cartel ensures we have some of the world's highest domestic gas prices.

AEMO needs to stop taking fossil fuel funding and focus on serving the national interests of Australia.

For all the fossil fuel industry lobbyist talk of the growing importance of methane gas in the Australian electricity market, and its ability to get the Australian Federal Resources Minister to unquestioningly parrot their views in denial of the climate science,³²⁸ the reality is very different.

Methane gas generation in 2024 to-day provides just a 5.5% share of the total, down from 7.3% share in 2020. Gas fired power generation is also an expensive power source given Australia's very high domestic methane gas prices, generated at an average \$207-345/MWh in 2024, double the wholesale electricity price average of \$123/MWh.

Excluding the two government subsidised gas power plants by EnergyAustralia at Talawarra B and Snowy Hydro's diesel / gas white elephant at Kurri Kurri, no new methane gas power plants have been built by private industry on the NEM for almost a decade.

December 2024 saw a key issue raised against building Australian over-reliance on expensive high emission methane gas power plants, that being the ongoing domestic shortage of supply fabricated by the multinational gas cartel to restrict supply to keep domestic prices at or even above international price parity. There continues to be enormous community resistance to the debacle of building methane gas importation infrastructure to lock in expensive imported supplies. Viva Energy and their fossil fuel lobbyists have proposed an expensive floating gas import terminal off the coast of Geelong, with the inevitable result that the firm will then have a strong vested interest to underpin progress on electrification and decarbonisation of household and industry across Victoria, as outlined by the Victorian Government's Gas Substitution Roadmap.³²⁹

As Tony Wood at the Grattan Institute says: "A gas-rich, wealthy country unable to supply gas to its major population centres is a massive failure of policy."³³⁰ The root cause is the self-serving methane gas cartel that is restricting domestic supply to maximise their profits, and the obvious permanent solution is to deploy a national Gas Substitution Roadmap.

December 2024 saw construction completion of Squadron Energy's Pt Kembla LNG import terminal.³³¹ CEF does question Squadron's ongoing calls for government subsidies to underwrite this long delayed terminal, in direct contradiction of Twiggy Forrest's lobbying for aggressive accelerated action in alignment with the climate science.³³²

³²⁸ Resource Minister Madeleine King, [Australia's Future Gas Strategy](#), 9 May 2024

³²⁹ ABC, [Plan to fix Victoria's looming gas shortage draws pushback from locals](#), 1 December 2024

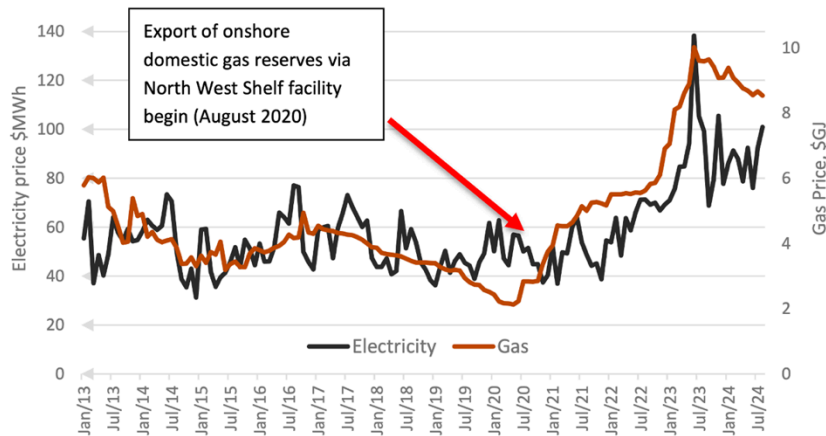
³³⁰ AFR, [Victoria is running out of gas and there is no easy fix](#), 5 December 2024

³³¹ Squadron Energy, [Port Kembla Energy Terminal ready to supply gas](#), 12 December 2024

³³² Squadron Energy, [Port Kembla Energy Terminal only solution to Australia's looming domestic gas shortage](#), 27 September 2024

The WA market is far more reliant on methane gas than the NEM in East Australia. However, the progressive undermining of the WA domestic gas reservation by the gas cartel has seen the price of domestic WA gas has tripled since 2020, and with it, driving a doubling of WA wholesale electricity prices – Figure 4.2.³³³

Figure 4.2: WA Wholesale Gas and Electricity Spot Prices



Source: The Australia Institute, December 2024

Snowy Hydro’s Kurri Kurri debacle

November 2024 saw new reports Snowy Hydro’s \$1.5bn 660MW Kurri Kurri diesel and gas power plant near Newcastle has advised the AEMO the first unit will not be fully online in April 2025, followed by the second unit in June.³³⁴

Whyalla Hydrogen Power Plant – South Australian Government

November 2024 saw the South Australian Government place the order for one of the world’s first 100% hydrogen capable gas turbines with GE Vernova for its 250MW Whyalla Hydrogen Power Plant which will provide peaking power to ensure grid reliability and complement South Australia’s world leading variable renewable energy penetration. South Australia sourced 85% of its October 2024 electricity needs from wind and solar, and has a target of 100% “net renewables by 2027. South Australia plans the world’s biggest hydrogen only power plant in Whyalla, backed by this 250MW electrolyser facility to produce the hydrogen from excess wind and solar.³³⁵

Yarnima Fossil Gas Power Station - BHP

December 2024 saw the WA EPA approve BHP’s expansion of it’s installed firm power generation capacity at the Yarnima Power Station from 154MW to 239MW. As per it’s current standard operating procedure, BHP views investing in more fossil fuel capacity as somehow consistent with its commitment to reduce emissions, deeming renewable energy and BESS as unviable, mainly in CEF’s view because BHP’s board continues to fail to accept the climate science and give commercial consideration to the currently externalised cost of carbon emissions.³³⁶

³³³ The Australia Institute, [Why WA energy prices have tripled](#), December 2024

³³⁴ AFR, [Generators scramble after NSW’s near miss on blackouts](#), 28 November 2024

³³⁵ RenewEconomy, [South Australia orders world’s first 100 pct hydrogen-capable turbines for Whyalla](#), 25 November 2024

³³⁶ BHP, [Yarnima Power Station Stage 4 \(Gas Reciprocating Engines\)](#), December 2024

Section 5 Demand Growth

China leads the world in terms of its progressive electrification of everything. With the rapid pivot to EVs and BESS, and development of AI and datacentres, Australian electricity demand is likely to increase ~1% pa over the coming decade, after two decades of flat electricity demand, totally decoupled from real GDP growth.

CEF would advocate for caution on overestimating demand growth, as this creates increased fear and regulatory responses of grid gold-plating that just cost consumers even more. Instead, measures to incentivise grid T&D owners to invest in ongoing energy efficiency gains and existing grid optimisations to largely offset data centre and EV demand growth should be prioritised.

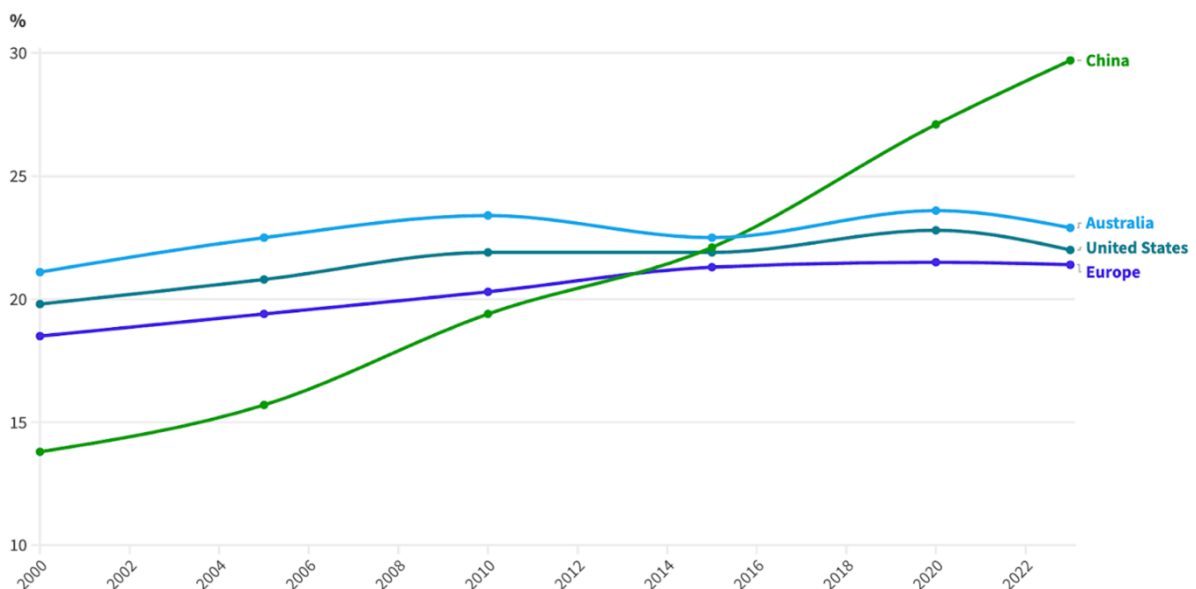
Electrification of everything is now a clear objective aligned with decarbonisation, given it is easiest and cost competitive to generate zero emissions electricity, and the substitution of internal combustion engines with EVs drives both decarbonisation and improved energy security.

The IEA projects through to 2035, global demand for electricity will rise six times faster than total energy demand. That's because of the new EV, but also the rising use of air-conditioners, AI data centres and electric appliances.³³⁷

China leads the world in its ongoing, progressive electrification of everything, having seen electricity rise from 14% of final energy demand in 2000 to 29% in 2023. Australia, like Europe and the US, have really lagged in this focus so far - Figure 5.1.

Figure 5.1: The Progressive Electrification of Everything in China is World leading

China has leapfrogged United States, Europe and Australia in electrification



³³⁷ Financial Times, [Will China win the clean-energy era?](#) 21 November 2024