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AUSTRALIA'S CLEAN ENERGY INVESTMENT OUTLOOK

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Executive summary

After a record breaking two years of investment in large-scale wind and solar projects, the pace of projects reaching financial close has slowed dramatically over the past two quarters. The Clean Energy Regulator announced this month that the large-scale 2020 Renewable Energy Target (RET) has now been met. What happens next is unclear.

Quarterly investment commitments in new renewable energy projects reached a high of over 4500 MW in late 2018, but has since collapsed to less than 800MW in each of the first two quarters of 2019.

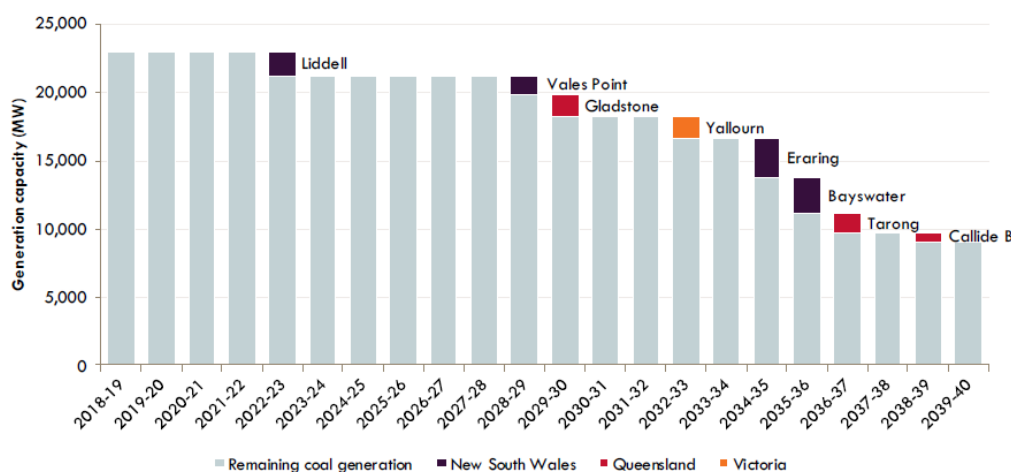
There has been a rapid increase in the number of utility-scale batteries being committed across Australia, combined with a proliferation of pumped hydro projects being investigated. There is no shortage of potential from utility scale batteries or pumped hydro to support the continued deployment of variable renewable energy projects. These storage projects can play a significant role to complement and support the continued deployment of renewable energy in a way that delivers a more resilient, affordable and reliable energy system.

However a lack of federal energy policy certainty and combination of a range of regulatory challenges mean that investment confidence in large-scale renewable energy and the accompanying energy storage is fragile. As Australia’s coal fired generation continues to close, there is a clear need for policy and regulatory reform to support the continued deployment of renewable energy and energy storage that will continue to reduce Australia’s energy sector carbon emissions, secure system reliability and lower energy prices.

Introduction

Australia’s coal generation is becoming increasingly unreliable and expensive to run. Large amounts of this generation will continue to retire over the next decade. As can be seen from the sudden closure of the Hazelwood power station in Victoria, failure to invest in sufficient new generation ahead of the closure of coal generation could have a dramatic impact on future power prices and system reliability.

Figure 1 – Expected retirement of coal-fired power stations out to 2040

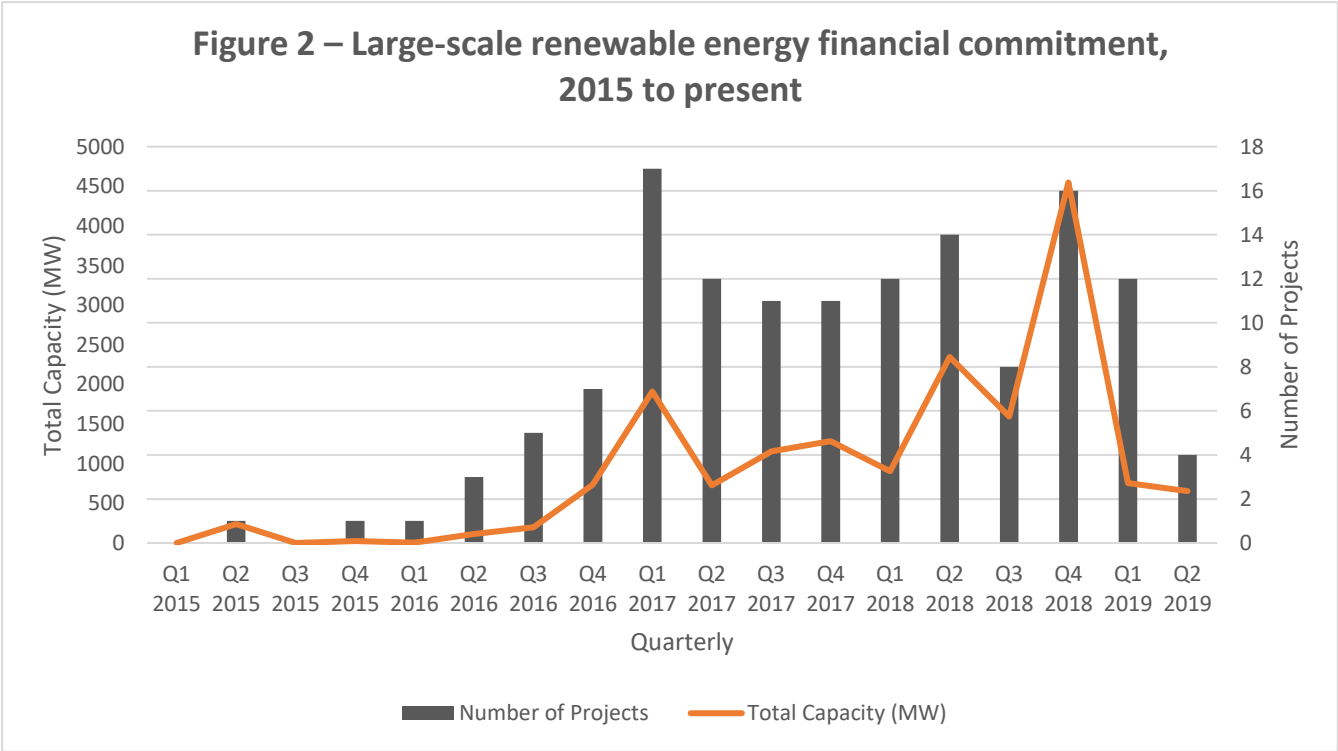


The least cost form of new dispatchable generation is renewable energy (wind, solar, hydro) with energy storage (battery and pumped hydro). According to CSIRO’s 2018 GenCost assessment “the investment costs of a wide range of low emission generation technologies are projected to continue to fall, and we found new-build renewable generation to be least cost, including when we add the cost of two or six hours of energy storage to wind and solar.”¹

While this paper focus on the investment outlook for large-scale renewable energy, Australia also has enormous potential in rooftop solar and household batteries. Distributed energy solutions will play a critical role in empowering energy customers and support a more resilient and distributed energy system that can deliver lower power prices and increased reliability. A range of policy and regulatory reforms are required to accelerate the uptake of these solutions. These are outlined in *The Distributed Energy Revolution: A roadmap for Australia’s enormous rooftop solar and battery potential*, which was published by the Clean Energy Council in September.

The 2020 large-scale RET was a highly successful policy which drove unprecedented levels of investment in new utility-scale generation over the past two years. Some 15,700 MW of new capacity has been financially committed over the past two years, with that generation either under construction or recently commissioned. This new generation was predominantly in the form of wind and solar, which has been supported more recently by investment in energy storage. With the absence of policy certainty beyond the 2020 RET and a range of regulatory barriers to overcome, investment commitments in new generation have fallen dramatically this year.

Financial close is a leading indicator for the level of new generation likely to come online in the future, noting a construction lag of between 6-24 months between financial close and full commissioning. As illustrated in Figure 2 below, the level of new investment committed in the first half of 2019 has fallen to 2016 levels, when then-Prime Minister Tony Abbott attempted to remove the RET and froze the industry during a lengthy review period. And with the rate of new investment now slowing, the forward outlook for wholesale energy prices has started to rise again.



¹ P Graham, CSIRO Chief Energy Economist, *Annual update finds renewables are cheapest new-build power*, media statement, Friday 21 December 2018

A sustained slow-down in the level of new large-scale generation will have a dramatic impact on Australia's energy prices and reliability, as well as the ability to achieve future emissions reductions targets.

Need for national policy

While new investment in utility-scale renewable energy no longer needs subsidies, investors do need certainty about future policy settings and the anticipated timely and planned phase-out of old coal generation. This is critical to give greater certainty of future wholesale energy market dynamics and subsequent revenue that investors can expect from the electricity generated by these projects. It is also important that the range of barriers discussed below are effectively addressed.

Record years for large-scale clean energy projects in 2017 and 2018 show a strong investor appetite for the Australian renewable energy sector. While it is not clear whether the drop in the flow of projects will be sustained, it has the potential to leave Australia exposed to higher power prices and risk system reliability. While there are a patchwork of state government approaches to filling the federal policy void, a nationally-coordinated response is becoming increasingly critical. In this context, a sensible national energy policy acts as insurance and can ensure new investment flows long into the future and ahead of further coal closure.

In addition, the deployment of renewable energy has proven to be the most significant contributor to Australia's carbon abatement effort. Renewable energy deployment has the potential to continue to do the heavy lifting in reducing national emissions, including assisting those other economic sectors where abatement is both more difficult and expensive. A slow-down in renewable energy investment would have a material impact on Australia's emissions outlook and ability to meet the emissions reduction targets agreed to under the Paris Agreement.

A range of policy options could provide the necessary investment certainty, including the National Energy Guarantee (NEG), an extended RET or a Clean Energy Target (as proposed by the Finkel review), or any number of carbon pricing policy mechanisms. This policy should be supported by implementing the Integrated System Plan (also a Finkel proposal), funding strategic transmission and introducing new markets for balancing and firming services.

Clearly there is a preference for strong national policy. As demonstrated through the NEG negotiations, this is a preference shared by the majority of NEM states including New South Wales and South Australia. The clean energy industry was a supporter of the NEG, along with the broader energy and business community. We urge the Federal Government to proceed with a version of this policy as a way to provide much-needed investment certainty.

The Commonwealth's Underwriting New Generation Investment (UNGI) program has the potential to support a wave of new projects, but a higher level of transparency is needed in relation to the selection of projects to minimise the impact on market confidence. Further, a single round of the UNGI program is likely to be modest in terms of the total investment necessary for the transition of the energy sector. It is currently too short term to provide enduring confidence to investors, and will unnerve many investors unless the government is prepared to provide more of an explanation about the criteria against which projects are being assessed and the long term role of the program. Given the program has been substantially altered from the original recommendation of the Australian Competition and Consumer Commission, it is currently not clear exactly what strategic priorities the program is targeting to resolve.

There is a strong and clear preference for national policy leadership in the energy sector. In the absence of this leadership, state governments will play a crucial role in providing policy leadership to underpin investment confidence and new investment. Targets and policy mechanisms such as Reverse Auction Contract for Difference mechanisms have proven effective across several Australian states and territories and are increasingly being adopted by other countries.

In any case, it is clear that corporate appetite for direct procurement of clean energy supply is on the rise. This is expected to drive further demand for new clean energy projects, particularly given the continued volatility and high level of wholesale power prices and the steady decline in the cost of renewable energy projects.

The uncertainty created by a lack of policy has been further aggravated by recent unexpected and unjustified regulatory interventions, including the Queensland Government's (now rejected) regulations requiring solar panels only to be handled by electricians and the Australian Energy Regulator's recent decision to prosecute a collection of wind farms in relation to protection settings and the South Australian system black event. Further still, political distractions such as a Parliamentary Inquiry into nuclear power and a task force into extending the life of the Liddell Power Station undermine investor confidence in market dynamics and the outlook for sensible political and policy oversight of the energy transition.

If the risk of major policy changes or government intervention in the market continues, investors and private capital will shift to other countries around the world where there is greater policy certainty.

Connection and transmission issues

In addition to the absence of policy certainty, a range of regulatory barriers are adding uncertainty and risk for private investors. Grid connection processes for example are creating substantial uncertainty in timing, technical requirements and cost. Adding to this are the impacts of the current Marginal Loss Factor (MLF) regime, which is no longer fit-for-purpose for a 21st century energy system and causing much concern and unmanageable risk for investors.

Both MLFs and grid connection challenges are symptoms of an underlying condition: the urgent need to reform the energy system and to build new transmission to support continued investment in renewable energy and storage projects. AEMO's Integrated System Plan has identified a range of new investments that deliver a clear benefit to energy customers and ensure new poles and wires are built in the most efficient locations.

There are growing constraints in the transmission systems but there remains considerable uncertainty about how new investment in Australia's transmission system will be delivered. Accelerated reform of the transmission regulatory framework is essential. There is also an increased role for governments to accelerate and underpin transmission investments, such as the Queensland Government's decision to contribute up to \$132 million to connect Genex's pumped hydro project at Kidston in the north of the state.

The rise of 'firm' renewables and energy storage

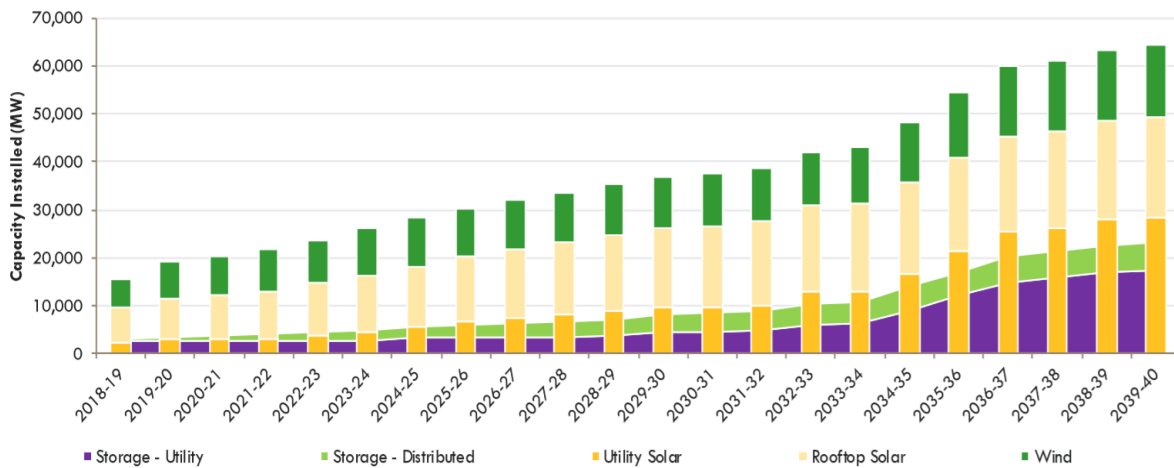
The National Energy Guarantee reliability obligation is now in place, ensuring that energy retailers will be obliged to contract with 'firm' generation should the market operator deem that to be necessary in the future. Firmed renewables and stand-alone storage projects will become increasingly important as more wind and solar projects enter the system, but recent analysis suggests that a relatively small amount of storage is required between now and 2030 to ensure the stability of the system. Major

projects such as Snowy 2.0 and Tasmania’s Battery of the Nation should set Australia up for higher and higher levels of renewable energy into the future.

The benefits of energy storage include the ability to complement variable renewable energy generation as well as provide very rapid system services (such as fast frequency response) that help to build resilience in the energy system.

Australia does not have an energy supply problem or a variable energy problem, but it does have a peak demand problem. It is important that we continue to build more clean energy projects ahead of the retirement of large generators such as Liddell to ensure the continued security of the power system and that it can meet peak demand. AEMO has predicted that some 17 GW of energy storage will need to be deployed by 2040 to continue to meet forecast peak demand. Currently the planned and proposed Australian energy storage projects represent only a portion of what will be needed by 2040 and planning and enduring policy is needed now to deliver against AEMO’s forecast.

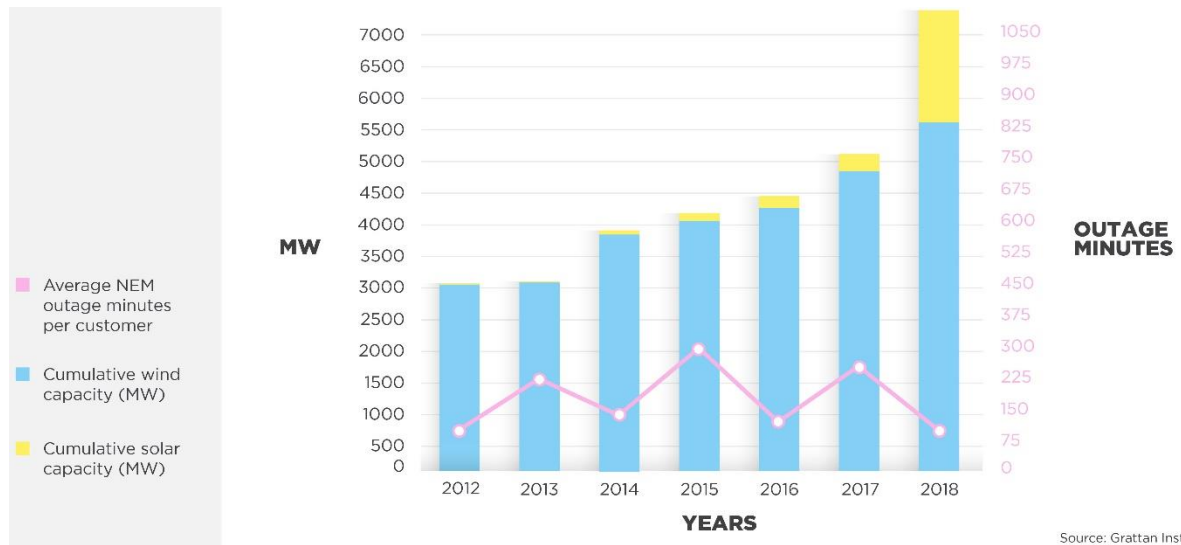
Figure 3 – Estimated deployment of renewable energy and energy storage by 2040 to meet forecast peak demand



Source: AEMO, Integrated System Plan, 2018.

Some of the political and media discussion about the energy transition underway dramatically overstates the reliability risks presented by increasing uptake of renewable energy. Over the past years, the increasing uptake of renewable energy has not however correlated to any change in reliability of the energy system (Figure 4 below). It is however important to recognise that the system operator has played a much more active role in managing the energy system in light of its changing profile.

Figure 4 – Average outage minutes per customer vs growth of renewable energy



Source: Grattan Institute

The latest Energy Statement of Opportunities (ESoO) from AEMO identifies the increasing reliability challenges with ageing coal units and the need for replacement dispatchable generation in coming years. A modest amount of new capacity will be required in Victoria in the next year and then South Australia and NSW further into the next decade, as outlined in the below table.

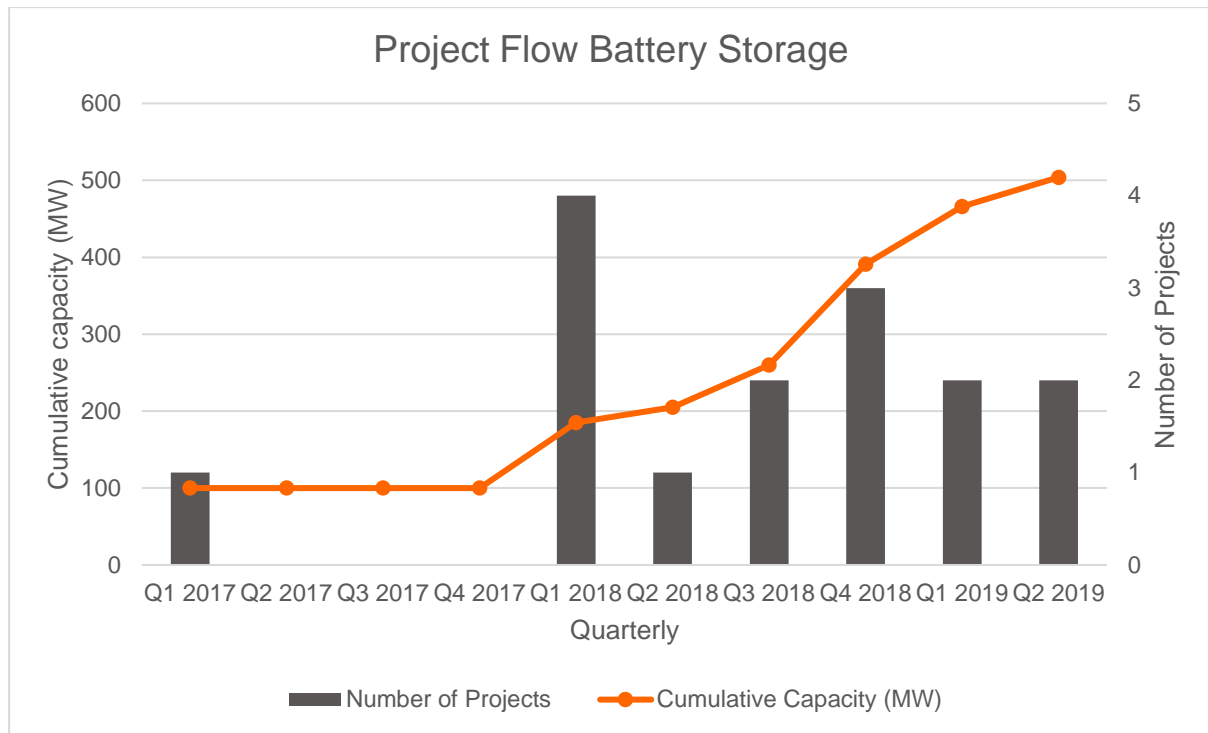
Table 1 Reliability gap (in MW) based on reliability standard and refined standard

	Gap to meet existing reliability standard			Gap to meet proposed refined standard		
	Victoria	South Australia	New South Wales	Victoria	South Australia	New South Wales
2019-20	125	0	0	560	0	0
2020-21	0	0	0	35	0	0
2021-22	0	0	0	0	0	0
2022-23	0	0	0	0	0	0
2023-24	0	0	0	0	135	375
2024-25	0	0	0	0	150	375
2025-26	0	0	0	0	95	300
2026-27	0	0	0	0	100	345
2027-28	0	0	0	0	70	300
2028-29	0	0	5	0	105	480

Source: AEMO, Energy Statement of Opportunity, 2019.

A growing pipeline of battery and pumped hydro projects are being progressed throughout Australia. Over 500 MW of utility-scale battery projects have reached financial close over the past two years.

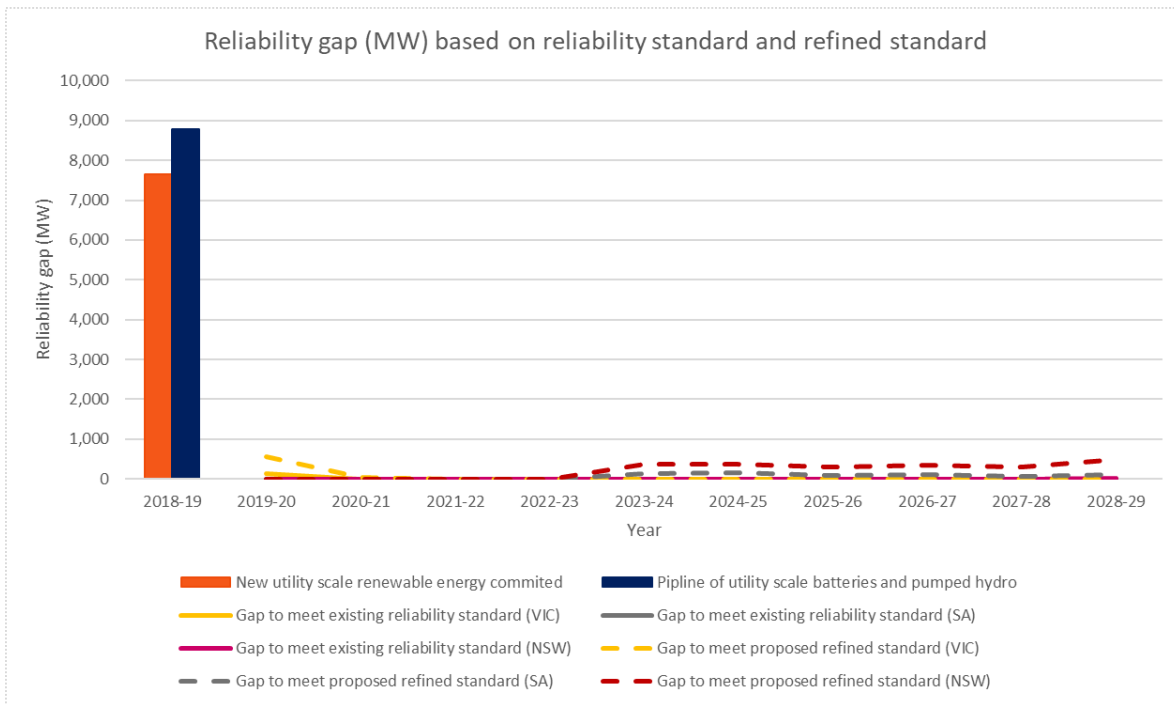
Figure 5 – Financial commitment of utility-scale battery storage projects, 2017 to present



More than 9000 MW of pumped hydro projects have been identified by developers throughout Australia, with substantial further potential being explored (but not yet announced publicly). There is no shortage of potential from utility-scale batteries or pumped hydro to support the continued deployment of variable renewable energy projects and to meet peak load as ageing coal-fired power stations exit.

In the context of the recent levels of investment in new renewable energy generation capacity (over 15,700 MW committed over the past two years) and the pipeline of battery and pumped hydro projects – that complement renewable energy to ensure there is sufficient ‘dispatchable’ generation is relatively modest and very achievable.

Figure 5 – System reliability gap and need for additional projects (MW)



Source: AEMO

The energy market can naturally provide a stronger commercial incentive for energy storage (by way of arbitrage) in the form of lower wholesale spot prices during the daytime (corresponding with high solar output) and higher prices during shoulder and peak demand periods. The move to 5-minute pricing within the energy market from mid-2021 will further encourage energy storage solutions. Effective markets for balancing services and arbitrage opportunities need to be established to ensure energy storage is delivered as the natural accompaniment to variable renewable energy and to maximise the value of the energy generated.

However, investment in energy storage is challenging without market reform and clear policy that can reduce uncertainty and recognise the value that these projects provide to the energy system and market. Streamlined grid connection processes and requirements are essential, as well as the establishment of clear ancillary services markets that recognise and monetise the value of services such as inertia, fast frequency response and voltage support.

The Australian Renewable Energy Agency (ARENA) is now playing an important role in supporting early-stage energy storage projects. However ARENA’s tenure and funding will shortly come to a close. The clean energy industry strongly recommends that ARENA is extended beyond 2021 so it can continue to support energy storage, particularly until necessary market reforms are implemented that will make more energy storage projects commercially viable.

There is a clear need for Federal Government leadership and stronger cooperation with state and territory governments in accelerating these reforms and providing clearer policy direction to underpin investment in new renewable energy generation and the required energy storage and network infrastructure.

Summary of recommendations:

1. The Federal Government should provide leadership and support the transition of the sector by proceeding with the National Energy Guarantee (or an equivalent policy) that will provide much-needed investment certainty. This should include clear targets for emissions reduction that will ensure decarbonisation of the energy sector well before 2050.
2. Accelerated reform of the transmission regulatory framework is essential to deliver the Australian Energy Market Operator's Integrated System Plan. There is also an increased role for governments to accelerate and underpin transmission investments.
3. Accelerate reforms to support the deployment of energy storage, including streamlining of grid connection processes and requirements. Clear ancillary services markets should also be established that recognise and monetise the value of services such as inertia, fast frequency response and voltage support.
4. Extend funding for the Australian Renewable Energy Agency (ARENA) beyond 2021, ensuring this is sufficient to continue to facilitate the transition to clean energy, support research and development into emerging technologies, energy storage projects and renewables integration work.
5. Build stronger leadership and cooperation with state and territory governments in accelerating regulatory reform to remove barriers and level the playing field for renewable energy and energy storage projects. More frequent meetings of state and territory Energy Ministers through the COAG Energy Council is essential.
6. Ensure transparency of the Commonwealth's Underwriting New Generation Investment (UNGI) program in relation to the selection of projects to minimise the impact on market confidence.
7. In the absence of federal leadership, state governments should play a crucial role in providing policy leadership to underpin investment confidence and new investment. Targets and policy mechanisms such as Reverse Auction Contract for Difference mechanisms have proven effective across several Australian states and territories and are a preferred approach.