The role of deep storage in our electricity system

White Paper

Snowy Hydro
March 2026

Contents

Baringa acknowledges the Traditional Custodians of the lands on which we work. We acknowledge their continuing connection to land, sea and sky. We pay respect to them and their Elders past and present; and acknowledge the peoples as the oldest continuous living culture in the world.

We acknowledge the land that we work on as the traditional lands of the Gadigal people of the Eora Nation (Sydney) and the Wurundjeri Woi-wurrung people of Narrm (Melbourne).

We're thankful to the custodians for caring for this land for more than 60,000 years and teaching us how to stay sustainably connected to the land, sea and community.

Introduction to this White Paper

This White Paper has been prepared independently by Baringa Partners for Snowy Hydro, to examine and provide a clear explanation of the role of deep storage in Australia's transitioning electricity system.

For the purposes of this White Paper, we define 'deep storage' to be greater than 16 hours of electricity supply, and we have focused specifically on the Australian National Electricity Market (NEM). In developing the paper we have also considered the role of Snowy 2.0 pumped-hydro energy storage as a deep storage technology, given the specific role this project and technology are expected to play in the future NEM.

As the electricity system transitions away from aging coal-fired power stations and towards a cleaner, lower-cost technology mix, it is important that the portfolio of technologies is suitable for maintaining a reliable, secure and affordable electricity supply. While wind and solar power should and will play a central role in this future electricity system, it will be critical that they are supported by a range of complementary technologies which ensure we have electricity whenever we need it and that the technical services needed to keep the system running are available. This need for a diverse and complementary technology portfolio is now well understood and is a focus of system planning and operations.

As identified in this White Paper, deep storage, including pumped-hydro energy storage, will play an important role alongside wind, solar, shorter durations of storage, and gas in Australia's clean energy future. In particular, deep storage will provide vital reliability and security services[1] through extended periods of tight supply when other generation is unavailable, such as during prolonged periods of low wind conditions. In this sense, it provides necessary resilience in the system to ensure the lights stay on and prices do not skyrocket when challenging conditions arise. These conditions rarely occur, but they do happen and the system needs to be prepared to ride them out.

Pumped-hydro energy storage can also provide important technical services to the electricity system in all conditions, helping to maintain a technically stable electricity grid alongside other dispatchable technologies like gas-fired power stations. The provision of these technical services will become particularly important as coal-fired power stations – which have traditionally provided many of these services in the NEM as a product of their spinning turbines – retire from the market.

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[1] *In the context of the electricity system, 'reliability' refers to having enough electricity supply available to meet all of our electricity demand and 'security' refers to keeping the electricity system technically stable and operating.*

Key findings

As coal-fired power stations retire, **more storage capacity will be required** in the NEM alongside wind and solar generation, to ensure we can meet our electricity needs at all times of day and night. **Deep storage is an important part of this future capacity mix** to provide system resilience.

Analysis shows that **long duration batteries will not do the job of deep storage** when extreme conditions arise, particularly as coal exits the system. Deep storage plays a **critical and complementary role** to shorter durations of storage and is **necessary to keep the lights on** during adverse conditions.

All durations of storage are typically able to provide **price stabilisation**, and deep storage can do this across longer periods of time. Across extended periods of low wind, deep storage can keep prices stable long after an equivalent battery capacity will have emptied its charge, **preventing prices from skyrocketing**.

As coal-fired power stations retire, deep storage technologies like pumped-hydro energy storage have an important role to play, alongside other dispatchable technologies, in helping to keep the **electricity system secure and stable.**

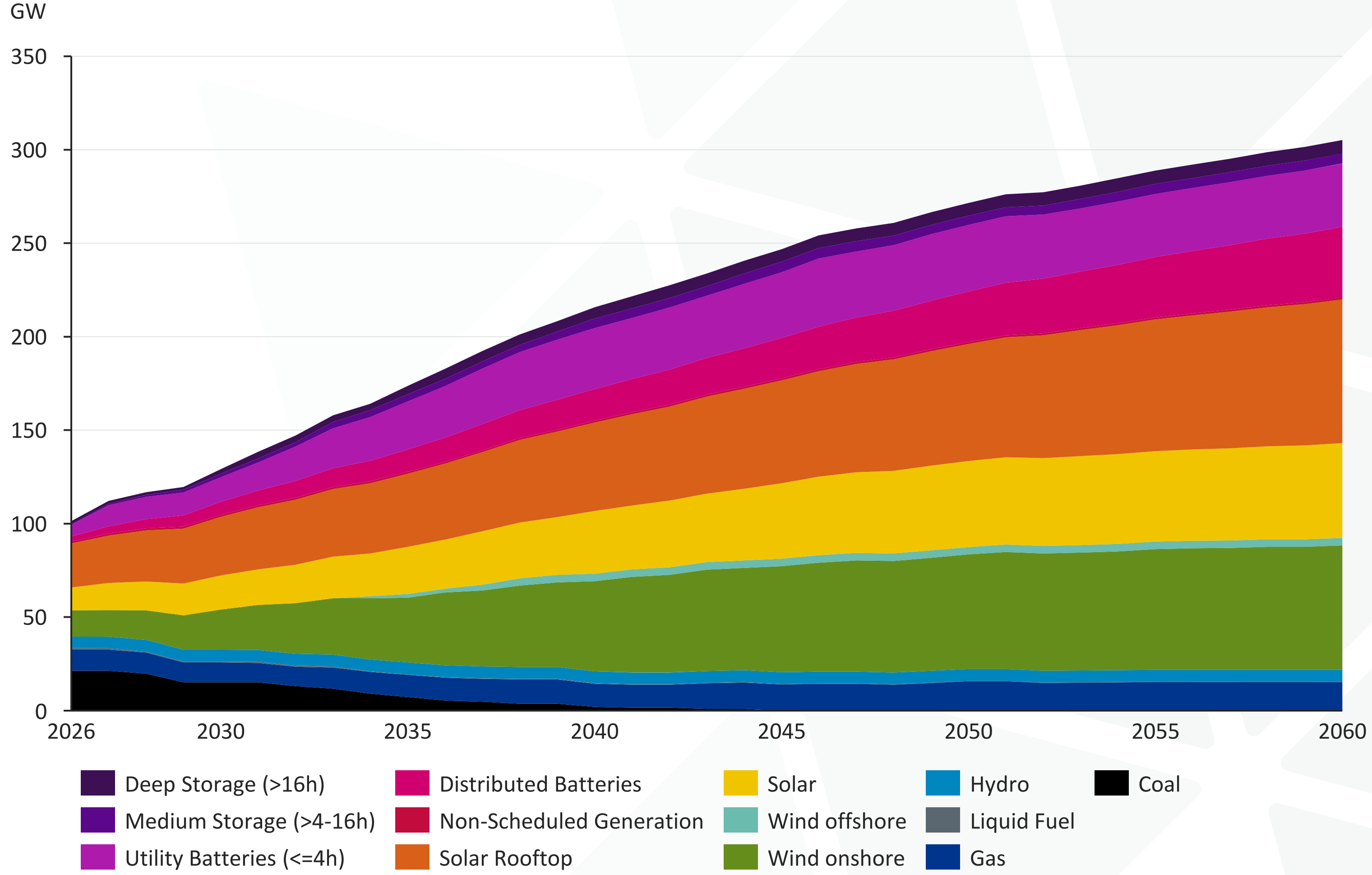
Role of deep storage in the electricity system

Thermal capacity will retire fully over the next 20 years, with the electricity system increasingly dominated by solar, wind, and complementary dispatchable technologies

NEM transition overview

- Over the next 20 years the NEM will undergo a significant energy transition, continuing the decarbonisation trajectory of the last decade.
- Ageing coal-fired power stations are projected to retire across all states, leading to a significant reduction in traditional baseload capacity (capable of constant, 24/7, power production) and traditional sources of technical services.
- New renewable energy capacity is expected to be developed at scale to replace coal capacity, mainly made up of solar and onshore wind projects.
- Dispatchable technologies will provide flexibility and firming to the high variable renewable energy system and will also provide technical services crucial to a secure grid.
- Behind the meter solar generation and storage are also projected to grow, decreasing demand from households, especially in the middle of the day.
- The installed generation capacity in the NEM is projected to grow from 90 GW to 220 GW between 2026 and 2060. Additionally, storage is projected to grow from 11 GW to 84 GW over the same period.
- It is important to also note the crucial role transmission upgrades and grid expansion will play in enabling this transition to a firmed renewable system.

NEM Capacity, FY



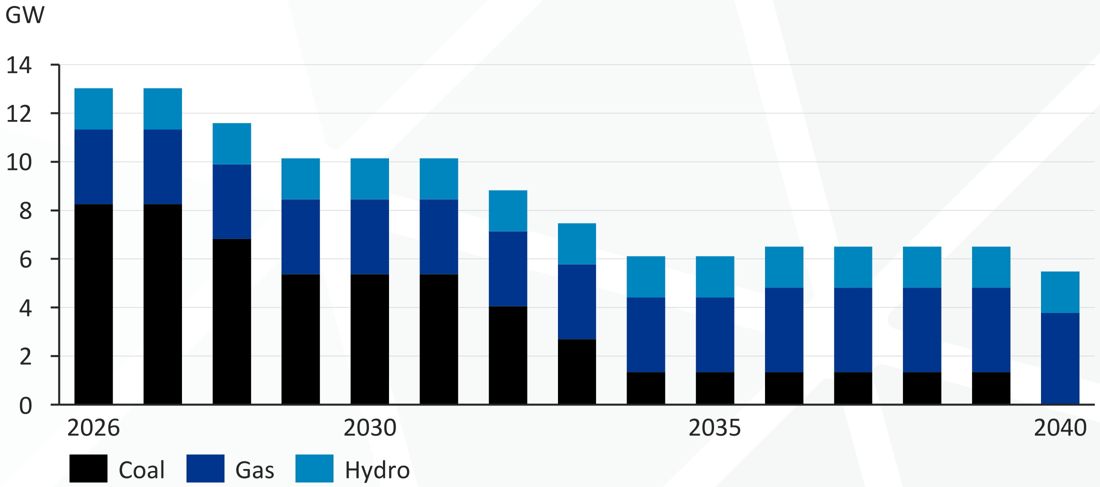
Source: Baringa Reference Case Q3 2025

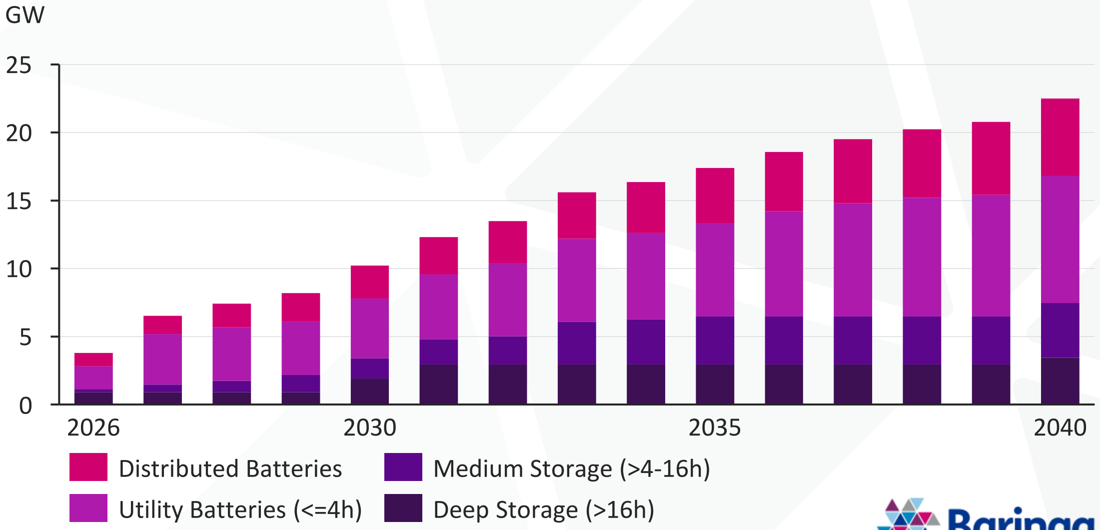
There is a growing need for investment in different storage technologies in the NEM, particularly in NSW and VIC, driven by anticipated closure of coal-fired power stations

Commentary

- Across the coming decade, NSW is expected to see almost 7 GW of coal capacity coming offline, including Eraring, Vales Point and Bayswater, with no further thermal build expected in NSW before 2035.
- Alongside renewables, there is expected to be substantial build-out of storage technologies to replace the energy and services traditionally provided by coal. Dispatchable capacity is expected to be made up of a range of technologies and durations to meet the needs of a high renewables system:
    - Distributed batteries (such as home batteries) are primarily short duration.
    - Utility scale BESS are predominantly 2-4 hour duration and will provide intraday dispatchable capacity and flexibility.
    - Utility scale BESS, some pumped hydro and other technologies such as compressed air are reaching medium durations (4-16 hours) and will provide inter-day flexibility.
    - Deep storage, expected to be provided primarily by pumped hydro projects, will provide system reliability across days and weeks during prolonged periods of low renewable generation and high demand.
    - Peaking gas plant and other dispatchable technology will remain important in providing capacity and system security for low probability but high-risk events.
- The storage pipeline for NSW is very strong, from the market and policy support, and it is important that the storage which is developed includes different durations.
- For longer durations, options such as BESS are currently uneconomic above 8-hour duration. Pumped hydro is a mature deep storage technology, with proven operations globally, while technology such as compressed air storage is being progressed and is the most advanced emerging technology.

NSW dispatchable capacity outlook, FY





Source: Baringa Reference Case Q3 2025

Across the year, deep storage is incentivised to ‘pump’ when there is plenty of renewable energy and generate when there is less, aligning with system needs

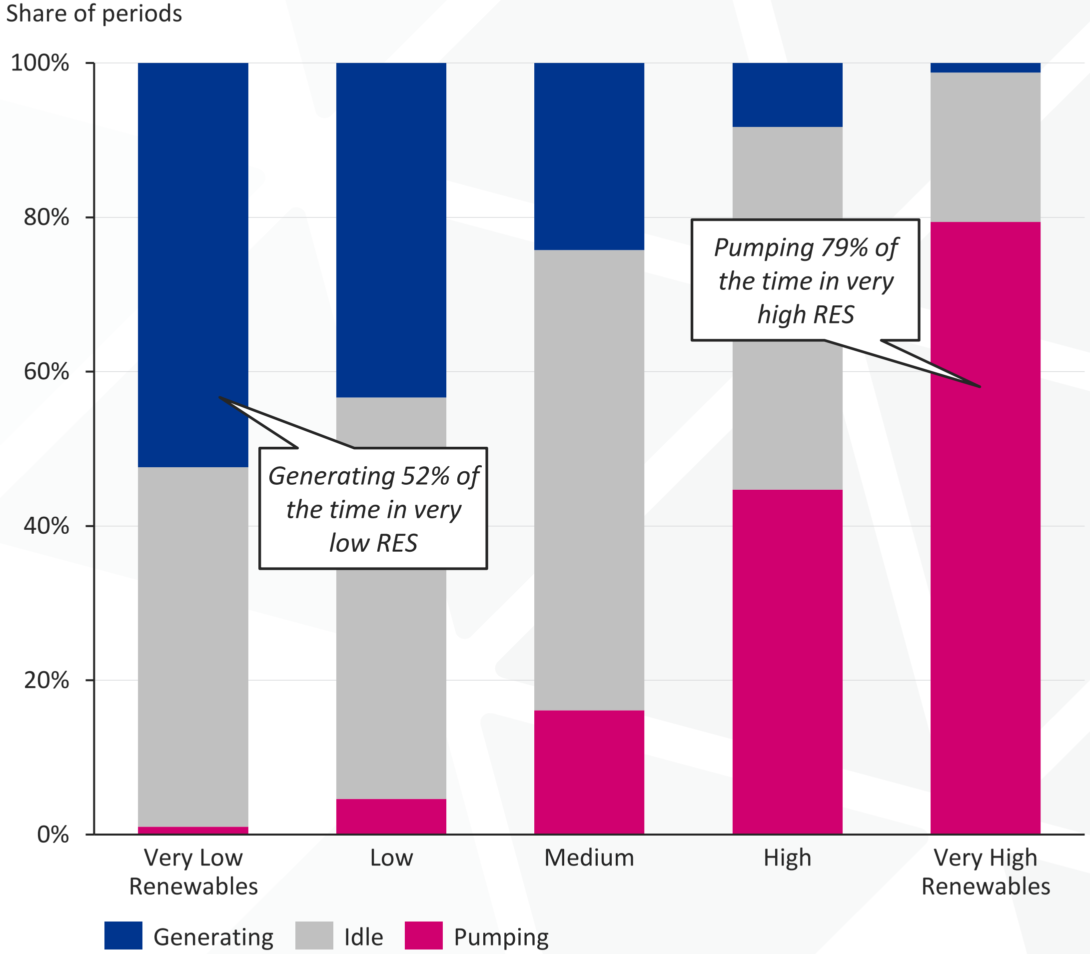
Commentary

- Deep storage, such as Snowy 2.0, will provide multiple services to the system and is incentivised by market prices to behave in line with the system’s needs.
- For the most part, storage will ‘pump’ or ‘charge’ during high renewable energy generation periods when prices are generally low and the system has adequate or excess clean energy being produced. This is demonstrated by the **pumping** bands in the chart to the right, which are concentrated in periods with higher renewable energy output. This behaviour can help reduce curtailment of renewable energy, soaking up energy that would otherwise not be used, supporting the business case for renewable projects.
- Conversely, storage will generate most in periods of lower renewable generation, typically with higher prices, as demonstrated by the **generating** bands in the chart to the right.
- An advantage of deep storage assets is that this behaviour can be **both**:
  i. Intraday – charging/pumping during solar hours to soak up excess renewables on the system and generating across the evening peak and into the night when solar generation is unavailable. This is common behaviour across storage of all durations to facilitate price arbitrage.
  ii. Inter-day – charging/pumping across multiple days if there is continuous excess renewable generation and generating for prolonged windows if the system is continuously in need of extra energy e.g. a wind drought coinciding with high demand. This prolonged time-shifting requires greater depth of storage and shorter duration assets cannot offer this service.

Snowy 2.0 is a pumped hydro energy storage project located in southern NSW. Once commissioned, the project is targeting 2.2 GW of dispatchable capacity and 350 GWh of energy (approximately 160 hours of storage).

While this White Paper is primarily intended to examine the role of deep storage in the NEM generally, Snowy 2.0 is the most relevant example and has been used for the purposes of this analysis.

Projected Snowy 2.0 behaviour during periods with different levels of renewable energy generation, FY35*



Generating 52% of the time in very low RES

Pumping 79% of the time in very high RES

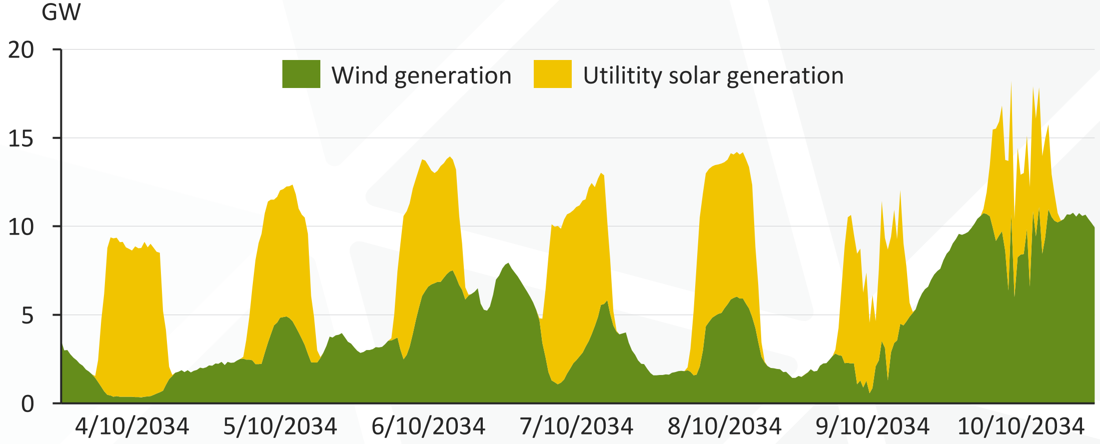
*Renewable generation levels are: Very Low = 20th Percentile, Low = 20th-40th Percentile, Medium = 40th-60th , High = 60th-80th , Very High = 80th-100th . **Source**: Baringa Reference Case Q3 2025

Under typical conditions, deep storage will charge during times with excess renewable energy and generate during non-solar hours, similar to shorter durations

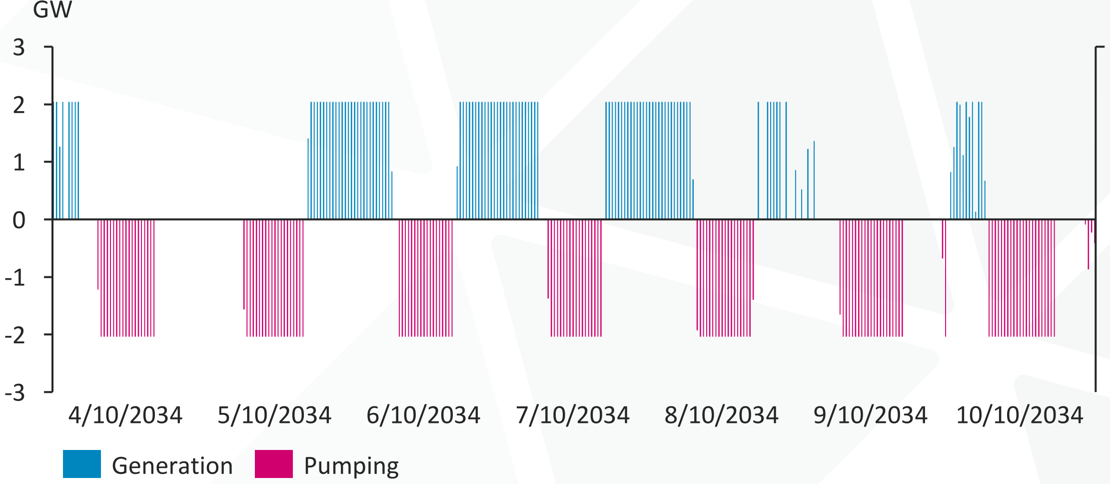
Commentary

- During a typical week, deep storage can "shift" energy across days to ensure energy which is not needed during high renewable hours (solar hours) is available when it is needed, typically over the evening and night (non-solar hours).
- This intraday cycling behaviour is seen in Baringa's model during weeks in which there are "typical" renewable energy conditions and the system is not under any major stress.
- The typical week example provided, based on simulated outcomes, illustrates this intraday cycling of deep storage which is aligned with the daily renewable energy cycling (and prices, which are not shown on these charts). As identified in the previous slide, this behaviour is typical of storage of all durations however the window of time in which the storage asset is charging/pumping or generating will differ with depth of storage.
- The value storage provides to the market during a week of typical conditions is:
  - By soaking up excess renewable energy that would otherwise be wasted, deep storage reduces the need to curtail (turn off) wind and solar farms during times of oversupply.
  - This shifting of energy helps maintain a stable and reliable electricity supply, even as the share of variable renewables, especially solar, increases.
- While not captured in these charts, storage is also able to provide a range of system services in these 'typical' conditions.

Renewable generation in NSW during a typical week



Deep storage behaviour in NSW during a typical week

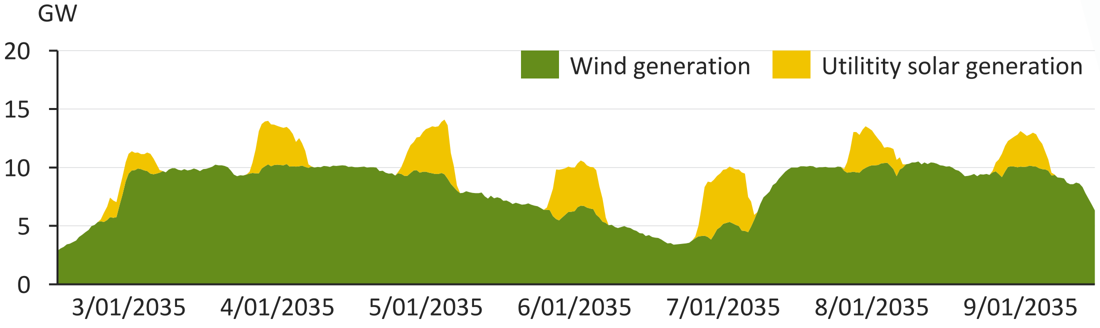


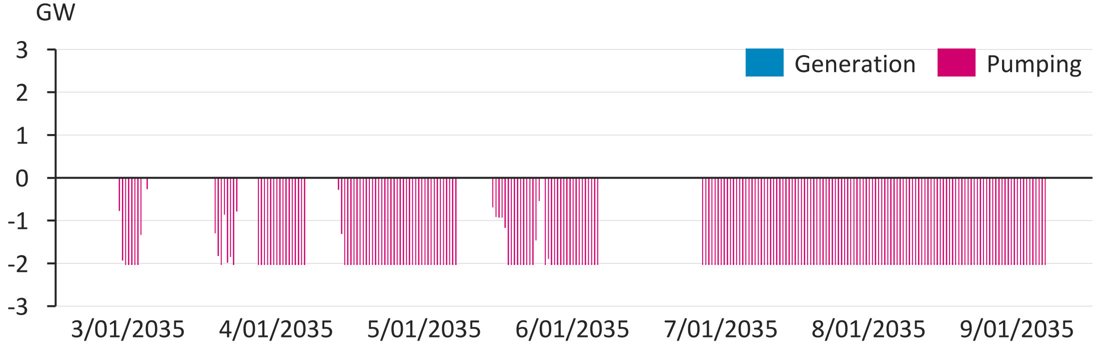
Source: Baringa Reference Case Q3 2025

Deep storage has the ability to support the grid through prolonged periods of high and low variable renewable energy, supporting efficient multi-day shifting of energy

High renewable spot week

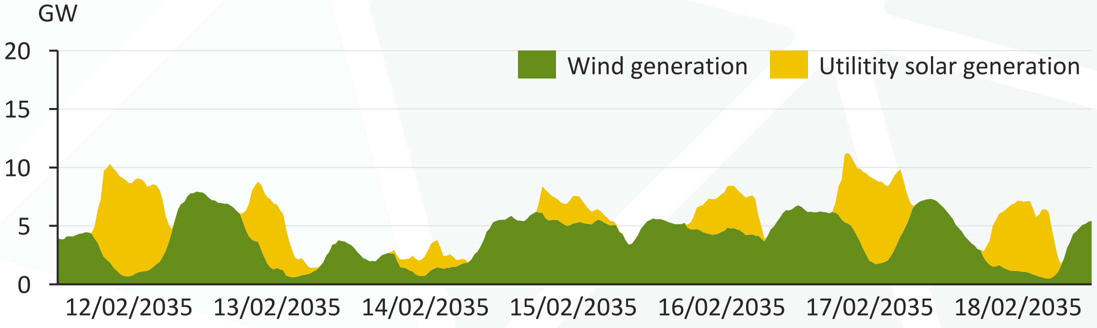
- A key value proposition of deep storage, relative to shorter durations of storage, is provision of energy and services over longer windows of time. It provides resilience to prolonged adverse conditions, such as wind droughts.
- During a projected week with relatively high renewable energy output in NSW, Snowy 2.0 was found to pump for 77% of periods across the week.
- The depth of storage allows it to pump for almost six days continuously, soaking up the excess renewable energy being generated due to high wind and solar production in the state.

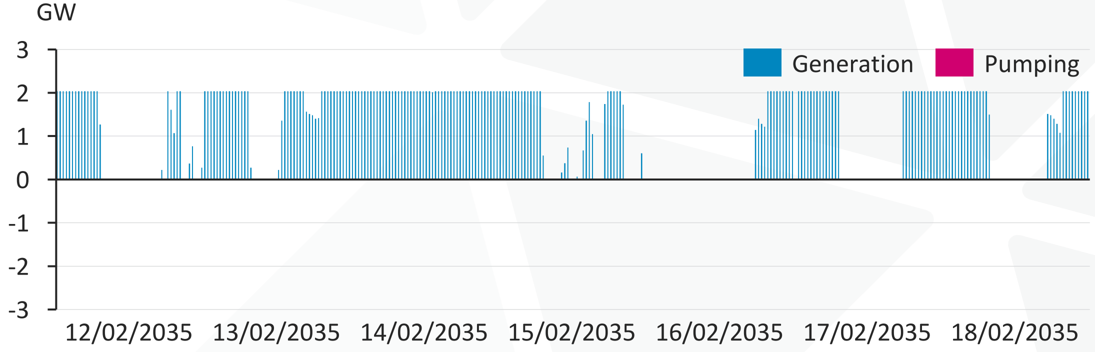




Low renewable spot week

- During a projected week with relatively low renewable output in NSW, Snowy 2.0 is found to not pump at all (0% of periods) whereas it generates for 63% of periods across the week.
- The asset is found to generate for stretches each day to add supply through the low wind and solar conditions, including generating continuously through two full days in this period when wind and solar production are particularly low.
- It is able to provide this energy without pumping through this week, meaning that the asset does not contribute to demand in the NEM when electricity supply is low.





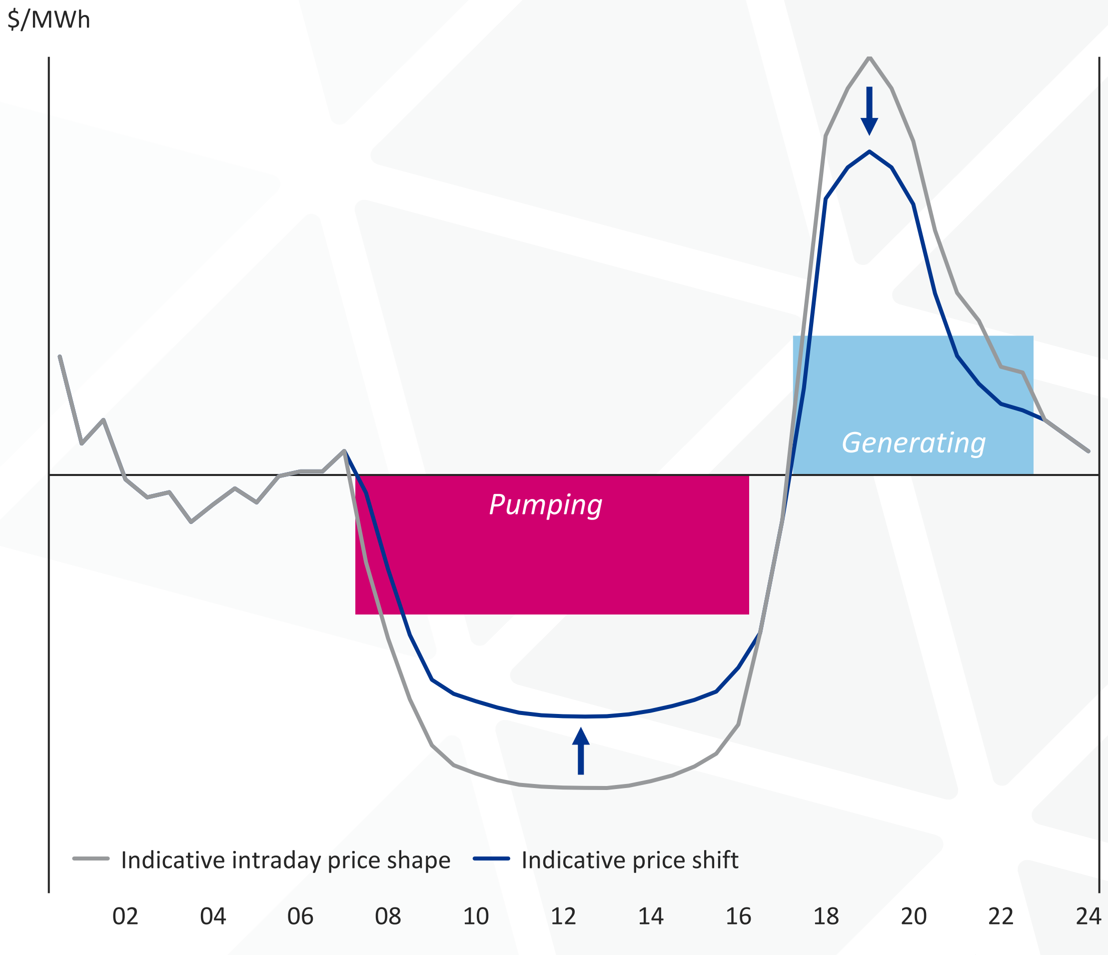
Source: Baringa Reference Case Q3 2025

Deep storage contributes to stabilising prices in the electricity system, helping to make peak prices less high and minimum prices less low.

Commentary

- Storage contributes to a reduction in price volatility in the NEM – by generating into high priced windows it puts downward pressure on high prices and reduces the peaks, and by pumping or charging during low priced windows it pushes these lower prices up. Typically, the net outcome of this reduction in volatility is a reduction in average electricity prices with the impact on high price reduction having a greater impact on average prices than the impact on low priced windows.
- The chart to the right illustrates the indicative impact of a storage asset on average intraday electricity prices. In general, a storage asset:
  - Charges during the lowest price periods of the day (usually solar hours through the middle of the day) where the price is often near-zero or negative. By increasing electricity demand on the system, the asset increases the electricity price.
  - Generates across the highest price periods of the day (usually the evening peak when there is limited or no solar energy available and demand has increased) which often have very high price spikes. By generating and adding more supply to the market in these periods, the asset decreases the electricity price.
- In terms of day-to-day price stabilisation, a range of technologies and storage durations from short duration batteries through to deep storage and gas support this outcome – this is not something for which deep storage is specifically required given that day-to-day price fluctuations tend to last for limited windows of time.
- Deep storage is able to continue to have this price stabilisation effect, making the high prices less high and the low prices less low, over periods of more prolonged price extremes, such as through extended periods of high demand or low coal or wind availability.

Indicative impact of deep storage on intraday prices



Testing the role of deep storage

To test the role of deep storage, we modelled a counterfactual scenario in which Snowy 2.0 was removed and replaced with an equivalent capacity of batteries.

Modelling approach

Baringa undertook sensitivity analysis within a market model to compare market outcomes under two scenarios, seeking to understand the operation and market impacts of Snowy 2.0 relative to an equivalent replacement capacity (GW) of batteries. This sensitivity was designed to provide a very indicative picture of the value to the market of deep storage relative to shallower storage, particularly under conditions of market stress.

As illustrated in the schema to the right, the two market scenarios selected for the analysis were:

- A **Base Case scenario** which includes the development of Snowy 2.0 within an optimised technology mix across the NEM, and
- A **Counterfactual scenario** which holds all market assumptions consistent with the Base Case, except for the development of Snowy 2.0 which is assumed not to go ahead and is instead replaced with the development of an equivalent capacity (GW) of battery, assumed to be 8-hour batteries developed in NSW.

The decision was made to build an equivalent capacity (GW) rather than depth (GWh) of storage in the counterfactual given the appropriateness of this assumption to examine the market impact of deep storage. Further, to build an equivalent depth (GWh) of 8-hour batteries to the depth of Snowy 2.0 (approximately 160 hours) would have resulted in a significantly greater capacity (40 GW) being built, resulting in oversupply in the market under normal conditions.

The sensitivity analysis was undertaken under two weather scenarios:

1. 'average' weather conditions (based on 2013/14 weather year);
2. 'low wind' weather conditions (based on 2010/11 weather year) – this is the analysis presented in this White Paper, as it best captures the occurrence of low wind conditions which don't occur frequently but which have and will occur, in which deep storage is particularly critical to maintaining reliable, secure and affordable supply.

Finally, two spot years were selected for analysis in the projections as representative of future conditions in the modelled scenarios – 2032 (coal remains in the system) and 2041 (coal has retired from the NSW system in the modelled scenario).

Base Case scenario	*Counterfactual scenario*
Central market assumptions.	Central market assumptions.
Snowy 2.0 is included in the future energy mix.	Snowy 2.0 is excluded from the future energy mix.
Storage volumes assumed to be developed in the central market assumptions, as part of an optimised technology mix.	Additional 8-hour BESS is included in the future energy mix, equivalent to Snowy 2.0 capacity (GW), along with the other storage volumes already assumed to be developed in the central market assumptions.
Weather year 2010/11 (*chosen for this report*)	Weather year 2010/11 (*chosen for this report*)

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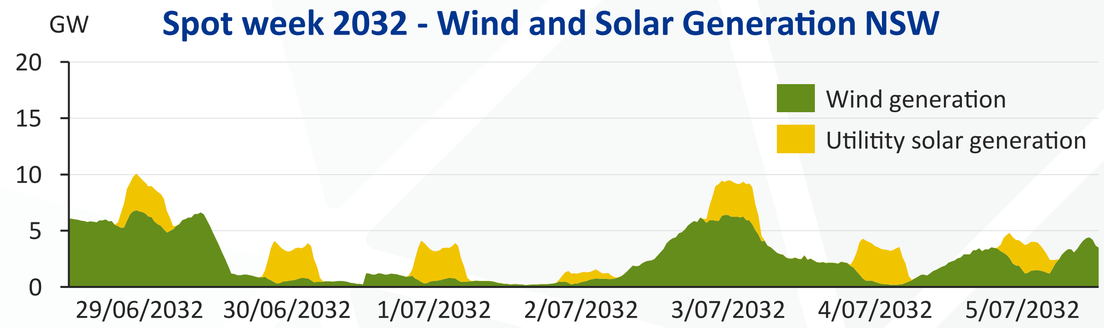
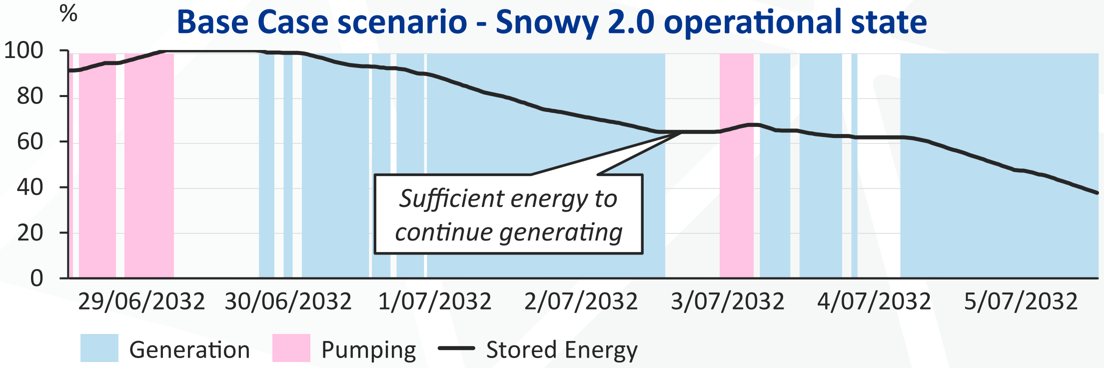
The sensitivity analysis of an example low wind week in 2032 found that Snowy 2.0 generates for sustained periods to meet system needs, while battery output is limited

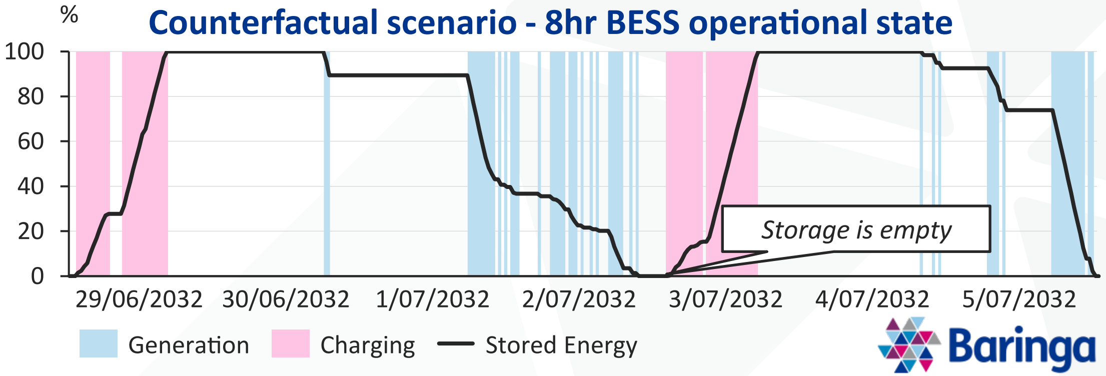
Commentary

- The illustrative 2032 spot week chosen in the projections (June 29th –July 5th) demonstrates very low solar and wind conditions in NSW. These initial projections for spot year 2032 reflect market conditions with coal-fired generation remaining in the NEM and providing dispatchable energy alongside storage.
- During the spot week, the lowest daily wind generation is 18.5 GWh compared to an average daily generation of more that 81 GWh from wind across 2032.
- In this analysis, we have considered this same spot week, with the same low wind and solar conditions, under each the Base Case scenario with Snowy 2.0 and the counterfactual scenario with BESS replacing Snowy 2.0.
- The results of the analysis illustrate a significant difference in the operation of the large capacity of deep storage relative to the operation of the same large capacity of medium-duration BESS:
  - **Base Case scenario with Snowy 2.0**: As illustrated in the middle chart to the right, in this scenario the deep storage is found to generate for almost all of the most severe low wind periods in the spot week. The storage asset is found to generate for 64% of the week and provides near-constant generation to the market for prolonged windows of time – essentially operating as a baseload asset. The asset pumps/charges during relatively high renewable hours within the week, though has sufficient energy to continue to supply the grid through the week without these charging windows.
  - **Counterfactual scenario with 8hr BESS**: As illustrated in the lower chart to the right, in this scenario the storage is found to dispatch in selected periods through the week. The dispatch reflects that it does not make sense for the battery to charge regularly in the low renewables conditions and so it makes an assessment of the most strategic periods in which to dispatch between charges (noting the asset is modelled with perfect foresight). While it does have a large total capacity, the 8-hour duration of storage means it is only able to supply energy for a more limited period of time. The 8hr BESS generates for only 17% of periods across the week.


Spot week 2032 - Wind and Solar Generation NSW


Base Case scenario - Snowy 2.0 operational state

Sufficient energy to continue generating


Counterfactual scenario - 8hr BESS operational state

Storage is empty

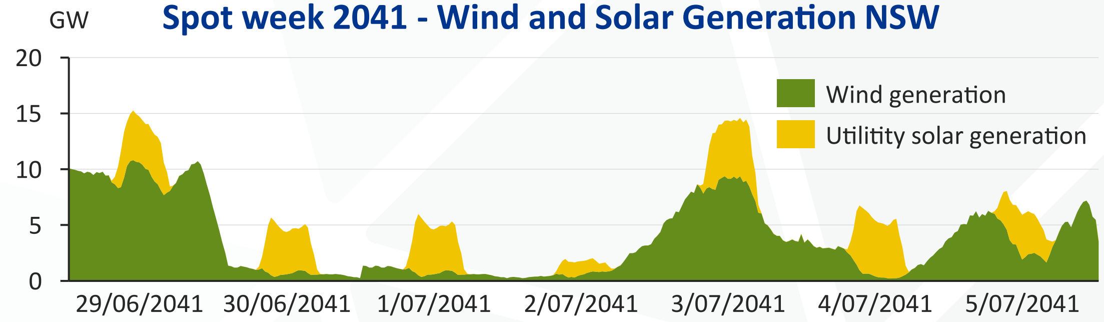
Source: Baringa bespoke modelling

Sensitivity analysis of a low wind spot week in 2041, in which NSW and Vic coal has retired, found that Snowy 2.0 generated continuously across a number of days

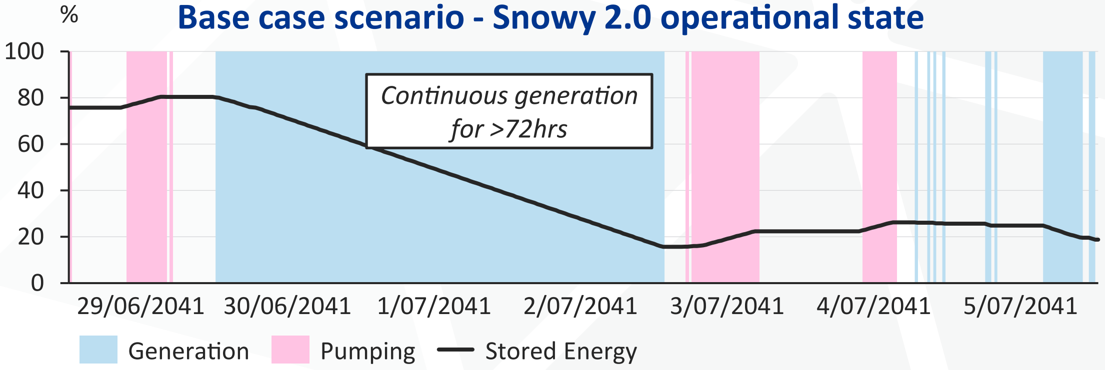
Commentary

- The illustrative spot week chosen for examination in the 2041 projections demonstrates very low solar and wind conditions in NSW. This is the same week of the year as was considered in the 2032 analysis, however the market conditions by 2041 have changed with coal exiting the NSW and Vic markets and a greater volume of both solar and wind, as well as other installed solar.
- During the spot week, the lowest daily wind generation is 24.4 GWh compared to an average daily generation of more that 120 GWh from wind in 2041.
- Consistent with the 2032 analysis, for 2041 we considered the relative operation of Snowy 2.0 (Base Case scenario) and an equivalent capacity of 8-hour BESS (Counterfactual scenario) under the same low wind conditions.
- The analysis again illustrates that despite the significant capacity of each Snowy 2.0 and the replacement BESS, the assets have very different operational profiles and value to the market during prolonged low renewables conditions:
  - **Base Case scenario with Snowy 2.0**: As illustrated in the middle chart to the right, in this scenario the the storage asset is found to generate for 50% of the week but generates continuously for an extended period (74 hours) to provide a baseload-like supply through low wind and solar conditions. The asset begins this period of dispatch with less than full capacity (approximately 80% of total storage capacity) and following the period of dispatch drops to a storage capacity of 15% before pumping when wind and solar conditions improve.
  - **Counterfactual scenario with 8hr BESS**: As illustrated in the lower chart, in this Counterfactual the storage asset again operates in selected periods through the low wind conditions, strategically allocating its energy across the three days in which it doesn't make sense for the asset to recharge. The asset storage capacity is fully expired by the end of the 3-day wind drought before it recharges in the more favourable conditions. The 8hr BESS generates for only 11% of periods across the week.

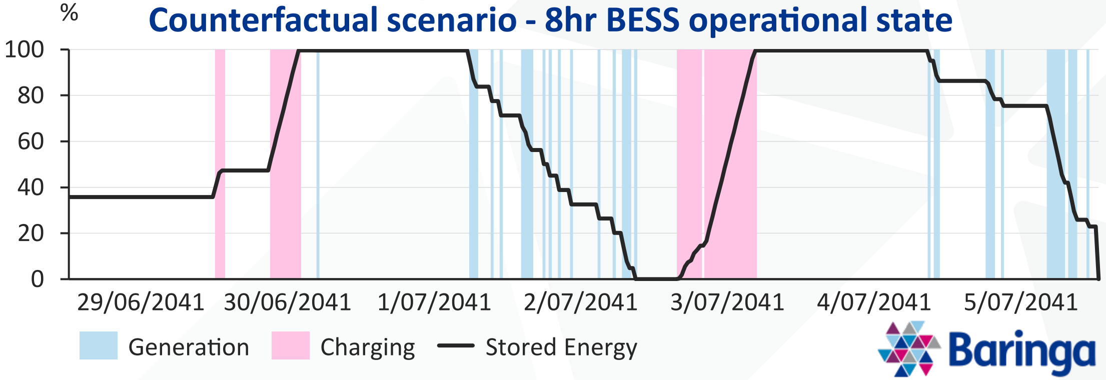
Spot week 2041 - Wind and Solar Generation NSW



Base case scenario - Snowy 2.0 operational state



Counterfactual scenario - 8hr BESS operational state

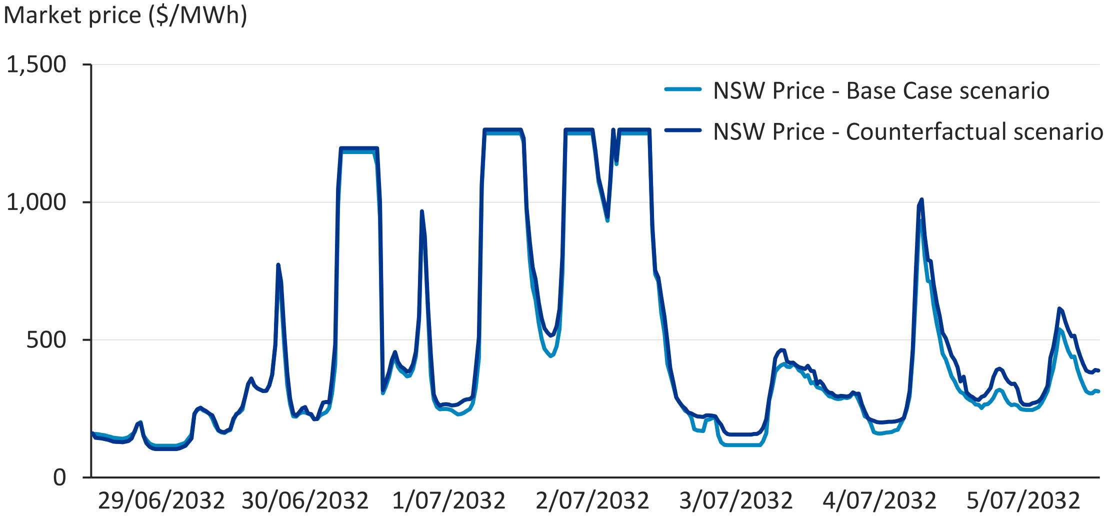


Source: Baringa bespoke modelling

After coal exits the system and demand grows, deep storage is a critical strategic reserve to prevent electricity shortfalls during low wind conditions

Spot week 2032 – Price comparison

- Due to low renewables across the spot week, there is limited supply in the NSW region and this results in high prices, reaching well over $1,000/MWh in 2032. The higher prices are driven by more expensive generation options being depended on to meet supply, with the lower cost options unavailable.
- In the Base Case scenario, Snowy 2.0 offers a greater volume of energy across the week than the equivalent storage is able to offer in the Counterfactual scenario. The result is that prices are slightly lower under the Base Case scenario during the lowest wind days, and also during the subsequent days of the week. The average price across the week is $26/MWh higher in the 8hr BESS Counterfactual scenario.
- NSW still has significant coal-fired power station capacity in 2032 and the system is found to have sufficient supply to meet demand without any electricity shortfalls, even without Snowy 2.0 in the market. However, coal generators are typically increasingly less reliable as they approach retirement, posing risks to supply in NSW.



Source: Baringa bespoke modelling

Spot week 2041 – Price comparison

- By 2041, the coal fleet in NSW is projected to have retired, replaced by renewable generation, storage assets and some peaking gas units.
- As the system has less baseload power in 2041, Snowy 2.0 has a much more significant impact on maintaining sufficient supply during the wind drought and the price outcomes under the two scenarios differ markedly as a result.
- Under the Counterfactual scenario, prices reach the market cap (over $26,000/MWh) as supply is extremely tight. The projections found some periods with electricity shortfalls, as the supply available cannot meet demand on the system.
- In the Base Case scenario, with Snowy 2.0 generating at full capacity across multiple days, prices peak at $8,283/MWh due to the tight supply on the system; however, the system avoids both electricity shortfalls and reaching the price cap. The average price across the week is $7,095/MWh higher in the 8hr BESS Counterfactual scenario.

Technical services provided by deep storage

Pumped-hydro energy storage, and particularly Snowy 2.0, will help to provide replacement critical technical services in the NEM as coal-fired power stations retire

- Maintaining operation of the electricity system is highly complex, requiring a wide range of technical services which help to maintain a stable electricity profile and help the system to recover quickly from disturbance events.
- Making sure we have the right services provided in the right places in the grid is crucial to system security. In the past, coal-fired power stations provided many of these services inherently, feeding them into a very centralised electricity grid on an ongoing basis. As these legacy power stations retire it is important that we are not only replacing the electricity supply that they have provided but also replacing the technical services that they have been providing as well.
- Pumped-hydro energy storage is a dispatchable technology, meaning that it can be turned on and off as and when required. Pumped-hydro is typically able to offer technical services not only when generating, but also when ‘pumping’ and – depending on the technology installed – can provide some services when sitting idle.
- Based on these attributes, pumped-hydro is expected to play an important role in the provision of technical services in our future electricity system, alongside other dispatchable technologies such as batteries and gas-fired generation. The tables to the right and on the following page provide examples of technical services pumped-hydro can help to provide.

Frequency control	Frequency control is the provision of services that, when required, can arrest a sudden drop or jump in electricity frequency before it varies too far, and returns the frequency to the normal range. This is important to helping the electricity system to quickly recover to normalcy following an unexpected disturbance like a generator failing or a major powerline coming down, so that electricity consumers are not impacted. Because pumped-hydro energy storage has the potential to both generate electricity into the grid and draw electricity from the grid, it can provide services to both raise the frequency of the system when it has fallen too low and lower the frequency when it has risen.
Inertia	Inertia in the power system is essentially the resistance of the electricity system to changes in frequency. In a system operating in the normal frequency range with a lot of inertia, the system will be slower to respond to a sudden change in frequency event – it can’t be changed quickly – making it more resilient to sudden events and giving the system operator and providers of frequency control services more time to respond. Inertia is important to the system as a means of providing resilience to shock events and supporting system security, to the benefit of consumers. Pumped-hydro energy storage can provide physical inertia with its large spinning turbines that slow the rate of change of frequency after disturbances on the grid, helping to replace the stabilising role historically provided by coal-fired power stations.
System restart	System restart, often called ‘black start’, is the provision of services to enable the electricity system to be restored after a black-out – an infrequent occurrence in the NEM but one which must be responded to rapidly and effectively in the case that it does occur. Pumped-hydro energy storage, particularly more advanced variable speed technologies, can provide valuable system restart services to re-energise the grid when fully powered by auxiliary power systems.

Pumped-hydro energy storage, and particularly Snowy 2.0, will help to provide replacement critical technical services in the NEM as coal-fired power stations retire

System strength and voltage control	Voltage is an electricity waveform parameter which must be managed within strict limits to maintain system security. Voltage control is the provision of services to maintain suitable voltage, and system strength refers to the ability of the power system to maintain and control voltage at a given location. Pumped-hydro offers an important and low-cost source of system strength for the system, with the cost of enabling this service from pumped-hydro and other storage typically much lower than some alternatives such as procuring additional synchronous condensers to do the same thing. Specifically in the case of Snowy 2.0, this project will provide system strength into a region with high renewable energy penetration which requires localised system strength for stability – something which the current fleet of coal-fired power stations cannot deliver even while they're still online.
Managing minimum demand	Minimum demand is the minimum level of electricity usage in the system, or at a given location and point in time. This increasingly occurs in the middle of the day when rooftop solar generation reduces the need of households and businesses for grid electricity. Low minimum demand can create operational challenges for the network and market, and the addition of electricity demand in these periods of time can help to alleviate these challenges. Pumped-hydro energy storage and other storage technologies can create additional demand on the electricity grid at times at which this demand is needed, such as during sunlight hours, helping to manage low minimum demand challenges.
Managing constraints	Constraints in the electricity grid when there are physical limits to the capacity of network assets in the power system. These can limit the flow of power from a generator in location A to demand in location B. Storage can play a role in managing constraints by charging/pumping or dispatching on one side of a potentially constrained line at certain times to get the optimal use from the asset and relieve some problems caused by system constraints. Snowy 2.0 is located on a major interregional transmission corridor with proximity to Victoria-NSW interconnectors and so could provide particularly important resilience, relief and contingency to constraints on those lines.

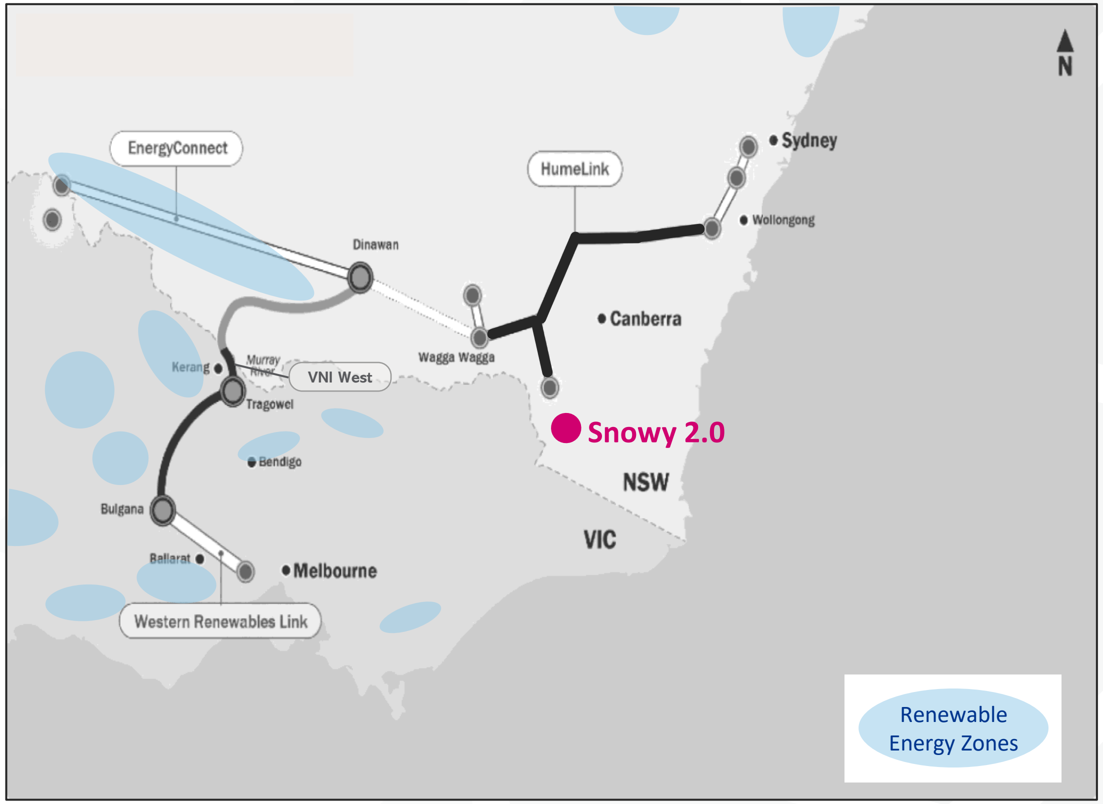
Value of technical services in the market

- Some technical services are currently compensated for in the NEM through market and non-market mechanisms. For these services, there is a financial incentive for technology developers to provide these services where their technology is capable to do so (and where it makes financial sense to do so).
- Some technical services are not currently compensated for, including a number of services which have traditionally been an inherent biproduct of generation by coal-fired power stations and other synchronous generators in the market.
- In recent years there have been a number of reviews and work programs investigating whether the current arrangements remain fit-for-purpose in the context of the changing technology mix in the NEM. As this work continues, it will be important that any new or amended framework for technical services is coordinated, provides clear signals to the market, and incentivises adequate investment in providing each service.

Unlocking the benefits of deep storage

The value of Snowy 2.0, a major deep storage project, will only be realised with coordinated development of generation and network infrastructure.

- The benefits of deep storage projects to the electricity system and electricity consumers, including through the provision of both energy and system services, will only be unlocked if the projects are sufficiently connected with the generators and consumers they are intended to shift electricity from and to.
- In other words, a project can only ‘absorb’ renewable energy when it has unconstrained network connecting it to generators, and it can only provide generation back to the market to meet demand to the extent the network can accommodate this power flow.
- Deliberate coordination of network infrastructure with deep storage, generation and electricity demand – including coordination of location and scale - will be crucial to ensuring consumers realise the value of deep storage in the system.
- In the case of Snowy 2.0, this means ensuring the network capacity in southern NSW can accommodate the project accessing power from wind and solar generation in the region and can also accommodate power flow from Snowy 2.0 back to Sydney once the asset comes online. Additionally, key infrastructure projects such as VNI West are critical to unlocking the benefits of Snowy 2.0 for renewable projects, and ultimately consumers, in Victoria. Without sufficient enabling network infrastructure, consumers will not see the value that Snowy 2.0 is capable of offering.
- As governments reconsider and adjust network planning responsibilities at national and state levels, it is important that this coordination is front of mind to manage system reliability, security and affordability as coal-fired power stations close and renewable build out ramps up.



Map Source: Vicgrid, 2024 (Victoria to New South Wales Interconnector West (VNI West))

This report provides an explanation of the role of deep storage in Australia's electricity market. Modelling and projections within this report related to Snowy 2.0 are illustrative only, and are based on best information available to Baringa at the time the analysis was undertaken (which may not reflect future conditions nor the actual operating parameters of Snowy 2.0). It is provided on a strictly non-reliance and 'as-is' basis.

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