Australia types of energy storage

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Currently storage of electrical energy in Australia consists of a small number of pumped hydroelectric facilities and grid-scale batteries, and a diversity of battery storage systems at small scale, used mainly for backup. To balance energy use across the Australian economy, heat and fuel (chemical energy) storage are also required.

A report from the Clean Energy Council (CEC) released in June 2024, titled The Future of Long Duration Energy Storage, noted that lithium-ion batteries (LIB) and pumped hydrogen energy storage (PHES) are currently the dominant energy storage systems for renewables in Australia. The CEC said emerging LDES technologies coupled with the energy ...

As Australia transitions to net zero, renewable energy storage is critical to ensure a secure, sustainable and affordable electricity supply. The report responds to common challenges around decarbonisation and technology readiness, examining the role of storage for seven sectors, and outlining the strengths and weaknesses of specific technology ...

Liquid air (LAES), zinc-bromine batteries (ZNBR), underground hydrogen and thermal energy storage systems are all being studied to meet medium-duration and grid-scale storage applications. LAES and ZNBR batteries are currently in pilot-scale demonstrations, while underground hydrogen and thermal energy storage systems require more time for ...

Pumped Hydro Energy Storage (PHES), Compressed Air Energy Storage System (CAES), and green hydrogen (via fuel cells, and fast response hydrogen-fueled gas peaking turbines) will be options for medium to long-term storage. Batteries and SCs are assessed as a prudent option for the immediate net zero targets for 2030-2050.

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In a speech in March this year, AEMC Commissioner Tim Jordan stated: "...by AEMO"s current calculations, outlined in the ISP, 61 GW of storage capacity is needed by 2050 under the Step Change scenario. That"s 17 times current levels." Federal and state governments have announced various policies to stimulate battery investment, but challenges to their development are starting to emerge.

Here we take a look at current proposals for storage across the NEM and their implications.

AEMO"s Electricity Statement of Opportunities ("ESOO") was published last month, and forecasts in its Central scenario some large storage projects to be operational by the end of 2032-33:

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Converting decommissioned power stations into large-scale battery storage is proving an efficient way to capitalise on existing electrical infrastructure (e.g. switchyards). The AEC has produced a guidance report highlighting considerations for this type of project.

In addition to the ESOO-listed projects, which are considered advanced in nature, there are many new projects hoping to progress towards completion:

While there is no shortage of projects, it is still a long way away from the $64 billion of storage investment AEMO forecasts is needed in its Step Change scenario. This might be one reason why governments are stepping in.

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