Specific energy storage applications australia

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A new report from the CSIRO has highlighted the major challenge ahead in having sufficient energy storage available in coming decades to support the National Electricity Market (NEM) as dispatchable plant leaves the grid.

The CSIRO assessment used the Australian Energy Market Operator"s (AEMO) 2022 Integrated System Plan for its analysis of what might be required with the step change and hydrogen superpower scenarios, suggesting the NEM could need between 44 and 96GW/550-950GWh of dispatchable storage by 2050, while Western Australia might need 12-17GW/74-96GWh.

The CSIRO expects investment in short and medium-duration storage to play an important part, while it also suggests investment in thermal energy storage systems would be required to deliver process heat in industrial settings. While there are a number of storage technology options the report flags that there are only a handful that are commercially mature. Others remain under development.

Landing on the most competitive and effective methods of storage will depend on its ability to be used along with site and regional factors that could influence the most viable technology even among similar sectors, according to the CSIRO. Below we take a closer look at the report"s findings.

The different types of storage technologies and applications are shown in figure 1 below.

Figure 1: Energy Storage Applications

Source: CSIRO Renewable Energy Storage Roadmap

Applications for energy storage and current limitations are outlined as:

Major grids: These will need a substantial storage capacity as dispatchable generation leaves the grid. It will need to be of varying durations to be able to deal with changes in supply and demand. There are limited commercially mature options deployable in the near term in Australia. Even the most widely applied currently - lithium-ion batteries and pumped hydro - face supply chain risks and geographical constraints respectively.

The remote and off grid mining: Short-duration storage associated with hybrid generation can reduce emissions in the near term. The elimination of emissions will also ultimately require long duration storage. These are not yet widely demonstrated at scale across mining operations.

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Remote communities: Storage linked with renewable generation has the potential to increase access to electricity supply, but eliminating emissions will need storage that can maintain power quality and deliver reliable energy for days or weeks.

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