

Does Great Britain need large-scale electricity storage?

It draws on studies from around the world but is focussed on the need for large-scale electrical energy storage in Great Britain (GB) and how, and at what cost, storage needs might best be met. In 2050 Great Britain's demand for electricity could be met by wind and solar energy supported by large-scale storage.

Why do we need a grid-scale energy-storage system?

Under some conditions, excess renewable energy is produced and, without storage, is curtailed<sup>2,3</sup>; under others, demand is greater than generation from renewables. Grid-scale energy-storage (GSES) systems are therefore needed to store excess renewable energy to be released on demand, when power generation is insufficient<sup>4</sup>.

Can a large-scale storage system meet Britain's electricity demand?

Great Britain's demand for electricity could be met largely (or even wholly) by wind and solar energy supported by large-scale storage at a cost that compares favourably with the costs of low-carbon alternatives, which are not well suited to complementing intermittent wind and solar energy and variable demand.

Which technologies are most suitable for grid-scale electricity storage?

The technologies that are most suitable for grid-scale electricity storage are in the top right corner, with high powers and discharge times of hours or days (but not weeks or months). These are Pumped Hydropower, Hydrogen, Compressed air and Cryogenic Energy Storage (also known as 'Liquid Air Energy Storage' (LAES)).

What are the applications of electricity storage?

There are many applications for electricity storage: from rechargeable batteries in small appliances to large hydroelectric dams, used for grid-scale electricity storage. They differ in the amount of energy that has to be stored and the rate (power) at which it has to be transferred in and out of the storage system.

Will GB need large-scale energy storage?

GB will need large-scale energy storage to complement high levels of wind and solar power. No low-carbon sources can do so at a comparable cost. Construction of the large-scale hydrogen storage that will be needed should begin now. [royalsociety.org/electricity-storage](http://royalsociety.org/electricity-storage).

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