

100% Renewable UK

<https://100percentrenewableuk.org/>

Options for Energy Storage

There are different types of uses for storage as well as a large number of technologies for storage. Broadly speaking, storage uses can be broken into three types: 1) short term balancing 2) balancing between daily peak and low loads and 3) long term storage to cope with up to, say, 10 days, of low output from wind/sun etc. Below are some links to how long term storage can be provided – I focus on this since there is little coverage of it elsewhere, and critics of renewable energy (wrongly) claim that renewable energy will always need nuclear power or fossil fuels to back it up. This is plain wrong.

The first, short term balancing market, is increasingly being met by batteries, which are proving to be more effective than traditional means of ramping up by conventional fossil fuel power plant or smaller decentralised oil and natural gas fired plant. The reaction times are the quickest and the cost of the batteries is falling fast.

The second market, that of batteries helping to match the variable production from renewable energy with consumption throughout the day is only really just getting going. Ultimately there is going to be easily enough battery capacity in electric vehicles as well as other places to ensure that peak demand can be met with a much reduced need for peak generation capacity. Peaks can be supplied by smart charging electric vehicles – to encourage charging of vehicles is done when the price is lower. Vehicle-to-grid transfers of power will also help so that when the grid needs power then some vehicles can send some power to avoid supply needing to peak.

The third market, that of 'inter-seasonal' or long term storage is currently only the preserve of models and demonstration schemes, although a wide range of technological options exist to deliver this service. This will mean that even in days when there is little wind or sunshine there will be enough 'stored' renewable energy (in substances such as compressed air or ammonia, or 'flow' batteries) to power converted gas engines, gas turbines or fuel cells to cover such periods. Excess renewable energy is a zero or near zero cost resource that can be utilised as a feedstock for such long term storage. We need much more money pumped in to provide demonstration schemes for long term storage options. Building extra conventional lithium batteries are not the best means of providing long term storage as they are relatively expensive of used only very occasionally compared to options which involve storing cheap types of fuel material (eg ammonia, compressed air).

Here are some links on some types of long term storage.

There is an account of how ammonia can be used to provide long term storage for renewable at: <https://realfeed-intariffs.blogspot.com/2019/11/how-ammonia-beats-batteries-to-supply.html>

Good summary of various storage options:

<https://www.energy-storage.news/blogs/contenders-long-duration-energy-storage-technologies-and-whos-behind-them>

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pumped hydro seasonal storage – this may work better in places with greater land resources (sparser population), eg USA? (in places), see <https://scitechdaily.com/seasonal-pumped-hydropower-storage-could-solve-the-renewable-energy-storage-challenge/>

Here's a link to a video by Highview Power who deploy systems of storage using liquid air: <https://www.highviewpower.com/>

Here is a link to the British trade association for Energy Storage, the Energy Storage Association; <https://energystorage.org/>

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