

Battery Storage in the recovery to NET ZERO CARBON! Questions and Answers

This document provides the answers to the questions that there wasn't time to respond to during the event on 8th July, 2021.

Page 98 of the IET COP EESS 9.12 RCD Selection gives guidance on RCD selection. Unless simple separation is provided by the power converting equipment or by construction DC fault currents are not able get into the connected electrical system type B RCD's should be fitted. Does this also include non-fault DC current such as capacitive leakage from solar PV panels?

This will by largely be down to the Engineer designing/installing a battery system where solar may be used. The three scenarios given cover almost all basis, for standalone EESS. Fault currents and capacitive leakage currents from DC systems should be dealt with as a Solar PV installation. The IET COP for grid connected solar PV systems has more on this.

Standards for home installation and lower power installations are less likely to have this as a risk because the power is so low, voltage becomes the worry.

Do the systems make much noise? Do they need cooling fans? I'm an environmental noise consultant and I'm getting more and more sites to assess, where BESS is part of e.g. a wind farm. Do they make tonal noise? As a new technology, manufacturer's data is limited especially on the issue of tonal noise.

Yes, some have fans, some use water as cooling, some use convection. It depends on the power and the temperature problem, and quality of the engineered design.

Looking at the whole picture I can only recommend that a noise report be created as part of any and all planning permissions to force installers and manufacturers to produce this data.

If lots of such battery storages are installed (various sizes and controls), would they cause difficulty in operation of the distribution system and transmission system (ESO)? Maybe - It depends on how well the data and systems integrate with the ESO. I'd hope they complement the system and help the grid wide network and the consumers as a whole.

Is there a danger that businesses will use BESS to simply save money as opposed to installing the likes of PV to save carbon? All they may do is peak shaving and buy the same amount of energy at off peak times.

Most businesses can't install solar because of the logistics around a buildings ownership etc.

So for a business to only install battery they don't just save on costs, but can also help increase the grid pull and demand for renewable investment, by utilising more low carbon grid power. You don't have to have solar with batteries, but its best to have batteries with solar.

How much of a progress do you think we have made on DC current being implemented in built environment?

Very little - I've seen this mentioned a few times within future building scenarios and future cities etc. It was big 8-ish years ago. It's technically sensible to implement when one considers efficiency of AC to DC conversion into electrical equipment. However when considering the efficiency of a DC system throughout a building, most recommended voltages for DC at 24V-ish. The losses from start to end are quite high, furthermore retrofit and resources for retrofit are and will continue to be too expensive to make it viable. More work needs to be done - but at the moment I don't see it in my life time.

What's the prospect that Mg_2+ or Ca_2+ batteries can displace $Li+$ batteries soon?

I honestly don't know. Battery chemistry technology is changing all the time. Its important to recognise this in designing a system.

Is there anyone leasing batteries? I can imagine that some businesses would be averse to locking up a lot of capital up front with multi-year payback, so a leasing model may be more tenable.

Yes, leasing of systems is done. Largely to help businesses with cash flow.

We have a good understanding of how our current energy system is causing climate change. Do we know if the emerging model will in any way be detrimental to the climate? e.g. I've seen a suggestion to have massive solar farms in north Africa and export the electricity to Europe, will this shift of heat energy not potentially change local temperatures and wind patterns?

I don't know - an environmental expert will be needed to answer this.

Different parts of the world are doing things differently. Their maximising the natural resources they have. Here in the UK it is Wind. The UK is driven to a decentralisation, i.e. reducing the need to move large amount of power down/across/through a country. Italy is moving to a more centralised system.

Has anyone started to look at power storage using weights and old mine shafts? Like those being trailed in Germany?

Yes, this is being done in Yorkshire in abandoned coal mines, and they are also using them to help with domestic heating.

battery = hours storage/retrieval, CAERS = days storage, Hydrogen = months storage/retrieval power gen. Not mentioned?

Batteries, especially LFP are also being used for months of storage, we have examples of week shift. Hydrogen projects at the moment are looking at days/hours (UK ferries for 2-3 hour journeys).

I'd say the engineer drive is more the commercial cost of the storage against the money saved/made depending upon power peak need and time, and more loosely based on the storage type.