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Q&A: Blackhill Battery Energy Storage System (BESS)

September 2022

What is a Battery Energy Storage System?

These systems store electricity, taking it from the grid when demand is low, and releasing it back into the grid when demand rises to supply our homes, offices, schools, hospitals and factories.

Why do we need them?

They help to balance supply and demand, which is becoming ever-more important as we increase the amount of electricity generated from intermittent renewables, such as wind and solar, to meet our climate change goals.

As we move towards using more electrics cars, buses and lorries, and phasing out gas for heating our homes and businesses, it is becoming increasingly important to carefully manage all the electricity we produce by whatever means.

The emerging East Devon Local Plan recognises that battery energy storage will form an important part of the energy security strategy for the district in the transition to low-carbon and this in turn aids the economic growth of the district.

Do they only store renewable electricity?

No, they are source neutral, meaning they will store whatever electricity is flowing through the grid, no matter how it was generated. But clearly, as more electricity comes from renewable sources in the future, the higher the proportion of renewable which will be stored and released.

They are not in themselves a renewable technology, but they are essential to a successful transition to a renewable future.

Why aren't batteries located on solar and wind farms?

Some are, but not all such sites are in the right location on the electricity grid to be able to support BESS, as power needs to be able to flow to and from the location in the right way. Locating battery systems reasonably close to towns and villages helps reduce power loss. As electricity passes through the grid, some is "lost" due to resistance in the network, and the further the electricity has to travel, the greater the loss.

Rolle Estate Office Bicton Arena East Budleigh Budleigh Salterton Devon EX9 7BL
Telephone 01395 443881 Facsimile 01395 446126 mail@clintondevon.com www.clintondevon.com

Estates Director: John Varley TD BA(Hons) MM (McGill) Dip M FCIM

Do they need a lot of maintenance?
Almost all operations and monitoring are carried out remotely, so actual on-site maintenance is limited largely to around one visit a week from an engineer. The previous quarry use saw around 320 HGV movements a day, and the permitted engineering works would have seen up to 234 cars and HGV movements daily.

Are they noisy?
A comprehensive technical noise assessment has been carried out which shows that, even in the worst-case scenario, there would be no observed adverse effects on the surrounding area. The assessment specifically looks at the nearest residential properties and concludes there would be no change in ambient sound levels at those locations.
The assessment shows the battery will produce sounds of 35-40 decibels, this is no louder than a car engine. The sound will also be contained by the natural amphitheatre of the site. On a site visit we noted near constant traffic noise which would be more intrusive. Operations can be managed so there is less noise at night when it could otherwise be more noticeable.

What kind of battery technology is used?
Like the vast majority of BES systems, we are proposing to use lithium-ion batteries. This is the same kind of rechargeable battery which is used in electric cars, smartphones, tablets, laptops and cameras. We will use the tried and tested Tesla Megapack batteries which are in use around the globe.

How safe are they?
They are very safe, and have a wide range of safety systems built-in. These can include fire control systems, smoke detectors, cooling, heating, ventilation, and air conditioning systems.

Why build one here?
The Blackhill Quarry site is a very good location for a number of reasons. It is brownfield land which has a history of industrial use, is well screened from the road, and away from people's homes so they won't be disturbed by on-site activity and noise. Equally importantly, it is close to a suitable connection to the electricity grid.

Will people be able to see it?
It is important to remember that a previous approved planning application for a new engineering works would have seen a building 14 metres high built here, but the maximum height of the BESS would be less than half of that, at 5.5 metres.

The system would only be visible to people passing close by on the bridleway known as Woodbury 11, and by people using the B3180 close to the site entrance. An in-depth landscape study concludes that any landscape changes would not be substantially adverse.

I thought Blackhill Engineering were going to use this site?
Planning permission was granted for an extension of the existing engineering facilities in 2018, but due to the impacts of the pandemic on its global markets, Blackhill Engineering no longer needs this additional space.

How much power will be stored here?
The capacity will be 60MW (megawatts) which is the equivalent of the output of 10 solar farms the size of Liverton Solar.

Are there any suitable alternatives to batteries for storing electricity?
Not in this area. Globally, the only other technology widely deployed for storing electricity is pumped hydroelectric storage. This uses reservoirs at different levels. Electricity is generated at times of high demand (expensive electricity) by turbines powered when water is released from the higher reservoir to the lower. At times of low demand (cheaper electricity), water is pumped back up to the higher reservoir.
Pumped hydroelectric storage requires either existing reservoirs of sufficient scale, or the construction of new reservoirs. Such reservoirs do not exist in the area, and clearly it would take many years to plan and construct them, should they be seen as desirable.

How common are these systems?
More and more of these systems are being installed across the country to aid the transition to renewable energy. According to the Department for Business, Energy and Industrial Strategy, in 2020 there was 1GW of battery storage in operation, with a further 4GW in planning, enough to power six million homes.

What are the peak times for energy consumption?
Energy needs reach their peak at 4PM to 7PM, and this is when the BESS will face the highest demand.

What would laying cables to the grid entail?
Cabling would all be underground, there would be a small element of visible infrastructure at the point of connection (pylon) to the main grid.
Directional drilling would be used so there would be no need for any road closures during construction. The route was short so cable installation would be complete in a matter of days.

The route has been chosen to avoid trees and a suitable buffer has been planned to avoid the possibility of any root damage.

Where will the electricity stored here come from?
East Devon should be considered a "micro grid" where the supply and management of electricity is constrained by the National Grid. We see the project as being important in managing existing operational, proposed and future renewable energy generation within East Devon to ensure ongoing security of supply.

Does this have any impact on the Liverton gas plant?
No, this will still be going ahead. While both projects aim to help ensure energy security for the people of East Devon, one does not impact upon the other.

Will this one installation be sufficient to fulfil all of East Devon's future requirements?
Not on its own. A range of systems across the grid will be required throughout the district.

What is the likelihood of a fire, and what safety measures are in place?
As with any electrical or industrial installation, there is a small fire risk.
The greater risk has been shown to be in transformers and inverters rather than in the batteries themselves. These will be placed away from the batteries for added safety. The layout of the batteries, inverters and other equipment is such that it will be possible for firefighters to access each individually. The single-storey battery layout further reduces the risk. Each unit will have self-contained foam extinguishers. There is a ready supply of water, previously used in the quarrying process, which would be used to cool unaffected equipment to further reduce risk in the event of a fire. The site will be monitored remotely 24/7. It is less than four miles from Exmouth Fire Station.
The commons are sufficiently distant not to be a concern, and well separated, for instance by the main road and quarry working.
A detailed fire management plan would be agreed with Devon and Somerset Fire and Rescue Service before construction began.

What measures will be put in place to protect the site?
The site will be secure, with fences in place for protection and cameras installed to monitor the site 24 hours a day, capable of functioning in darkness.

Will the site be lit up at night for security purposes?
The security lighting would be controlled by motion sensors so would only be activated if movement were detected.

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Will there be any additional screening?
The site is already very well screened by nature of its location and existing planting, and cannot be seen except up close. On the visit we saw how well screened the site already is.

What is the lifetime of the batteries?
Battery cells are expected to last around 15 years – at which point they would still be around 80% efficient so could be repurposed for domestic use, for example. The cells would then be replaced. It is worth noting that today's solar panels produce twice the energy per square metre of those installed in the early days of solar in the UK. Similar advances in battery technology would mean greater efficiency of the site.

Can the containers be stacked to increase the capacity of the site?
No, the layout proposed is the safest and best option. The insurers also agree this layout is the best option.

Could construction traffic be routed to avoid Woodbury village (B3179)?
A condition that construction traffic should use the Sidmouth road (ie A3052/B3180) would be reasonable. It is likely that almost all construction traffic would be non-articulated making it easier to manoeuvre and less disruptive to other road users.
It is also worth noting that once construction is complete, traffic connected to the site would be around one visit a week for maintenance purposes.

What do people who live nearby think?
The closest neighbours impacted are tenants, they have been consulted and are satisfied with the project going ahead.

Will here be a need for extensive groundworks at the site?
The quarry works floor is 18-inch-thick concrete so no major groundworks will be required.

There was a suggestion of a visitor centre once quarrying operations finished. Given the site is no longer required by Blackhill Engineering as previously proposed, is this now a possibility? Otherwise, can it be restored to heathland?
No, an industrial site in such an enclosed location is the wrong place to experience the heaths. Because of the concrete floor, restoration to heathland is practically impossible. Mitigation required as part of the Blackhill Engineering planning consent is well under way and a commercial plantation removed to make way for new heathland nearby, as seen on a site visit.