Submission ID: 33409

Including BESS can lead to fires, toxic fumes and polluted soil and groundwater as well as putting lives at risk and destroying wildlife and habitats.
Please refuse this application.

BESS - Farmers cautioned about field battery storage pitfalls

The Scottish Farmer - By John Sleigh – Editor – 1 October 2023

One farmer who was approached by a development company about long-term lease agreements for battery storage units has hit back at the proposed plans.

The farmer, from the Scottish Borders, said: “They initially sent a letter out to land-owners within a two or three-kilometre radius of the substation asking if they would be interested in leasing their land out to host a 'renewable project'. They said our land was in an ideal place and initially requested four acres of land to facilitate between 40 and 100MW of battery storage.

"They offered a £10,000 sign-on fee, with an additional £6000 to cover legal costs along with a long-term 40-year lease agreement paying £1500 for every megawatt of energy produced. I was initially drawn in by the vast sum of money offered and so within a short period of time they quickly upped the ask to lease 25 acres of land to install a massive 500MW storage Battery capacity plant."

He continued: "It all seemed too good to be true, as getting paid £1500 per MW x 500 (MW) would equate to a potential income of £750,000. If you then multiply that year on year for 40 years, it would result in getting paid tens of millions simply for leasing out 25 acres. When I asked the obvious question, why wouldn't they just purchase the land for a fraction of that cost, they replied, that it was not how they do things. Instantly, alarm bells started to ring!

“I wanted to know, if the Scottish Government were keen on these facilities, why were they not compulsory purchasing the land, or at the very least, building it into local planning requirements. There are loads of brownfield sites available away from homes which would be better suited. Why do they not just build the battery storage containers under the existing wind farms, as that is where the excess energy is being taken from?"

The farmer pointed out that there is a clear need for energy storage and he believes it could easily be done in such a positive way while not damaging food production, people's lives, property values, and the countryside.

“When I did further research into these battery plants, which basically resemble large shipping containers, it became apparent that there were many drawbacks, such as their concerning reputation for combusting into flames and creating massive uncontrollable fires, despite the fact fire suppressants are built into each container. These batteries get very hot and are very flammable and if they go up, fire response services are not equipped to cope with them", he explained.

"Fire services in England have already noted major concerns. If they try to douse them with water all the land beneath instantly becomes contaminated so often batteries are left to burn out releasing harmful toxic fumes into the air for many days. As my land is close to a number of residential houses and near the local village, I was not comfortable with this thought."

He also took into account the health risks and cancer-related issues of people who lived near electrical pylons and the fact that properties located near these battery storage units on average can see their homes devalued by as much as 34%.

"Green Power consultants said that a 500MW battery storage site was good for the climate/environment and could provide 150,000 homes with electricity (for a few hours). I said destroying prime arable land and covering it with concrete and rubble and then putting 150-200

large shipping containers full of potentially explosive batteries on it along with electrical transformers and a blast wall next to people's homes didn't sound like the best environmental or sensible move to me. They replied that they could landscape and plant trees around the site in a bid to hide it...which I find shocking!"

They have a short lifespan of just 7-8 years and the cost to construct such a site is estimated to exceed £20M and would take 1 -2 years to complete, resulting in dozens of HGV's driving through local villages on a daily basis.

"With technology moving so fast, what happens when these short-term battery solutions are no longer financially viable or if the development company decides to fold, who is left to clear up the site? The landowner or the taxpayer, or is the land just left as a chemical wasteland surrounding villages and homes for generations? If it costs £20 million to build now what will it cost in 10-40 years' time to clear up?

"It appears to me that while the Scottish government is keen to hit its climate targets, it could be guilty of failing to protect Scottish people and landscape. Protection Bonds should be put in place to ensure these sites are not left as derelict potentially contaminated lands for our children to deal with in the future."

He concluded that landowners will no doubt jump at the opportunity to make what, on the surface, appears to be such easy money but says they should do their research and not be drawn in

"If it sounds too good to be true there is a reason and I continue to find many reasons.

"Consider the long-term effects and cost it will have on your neighbours, and the community. Generations of farmers have spent their lives nourishing and protecting the land. Such projects would spell the end of farming on the land.

“I decided to walk away as the impact on the community, my family, home, and environment was too much of an ask. Of course, at my age, if I took the money, it would not be my problem in 40 years' time, but it is not the legacy I want to leave.”

The development company has been approached for comment.

Renewable Energy Batteries: Toxic Timebombs, Delivering Truly Trivial Output

The grand wind and solar ‘transition’ looks ridiculous enough, but claims about giant batteries fixing the grand intermittency problem look positively idiotic.

The cost of storing meaningful volumes of power is staggering, accordingly the volumes actually available for release into the grid are positively trivial.

Then there’s the battle that giant lithium-ion batteries have with the laws of thermodynamics.

[Note to Ed: There’s a name for devices that concentrate energy and release it rapidly; they’re known as ‘bombs’.]

When a lithium-ion battery self-combusts (as they have no trouble doing – see above) the fire cannot be extinguished – **the battery is simply left to burn itself out; it often takes several days**. In the meantime, they spew a toxic smoky cocktail, threatening lives and health of unfortunate neighbours.

For some time now, Francis Menton has been investigating and documenting not only the nonsensical claims made by wind and solar rent seekers about giant batteries, but also the increasing frequency of their self-fuelled pyrotechnic meltdowns.

New York And California Getting Totally Lost With Energy Storage
Manhattan Contrarian
Francis Menton
8 March 2024

BESS

Battery Energy Storage Systems or BESS are the hoped for answer to the problem of variable renewable energy (VRE) generators such as wind farms or solar parks.
The idea is that when the wind isn't blowing and the sun isn't shining these industrial batteries will release their stored electricity to the national grid when there is peak demand or insufficient renewable or other generation. BESS also have other uses, such as 'black starting' a windfarm – providing in house power to get systems and turbines running slowly after a windless period to get over the turbine inertia. (They may replace the diesel generators which are otherwise used for this purpose)
It's important to understand BESS as they're increasingly being included simply as an ' incidental add on' to industrial scale windfarms in Scotland with little or no consideration by consenting authorities. Large BESS are also being consented as stand alone planning applications- often near urban areas.
There are serious hazards and risks associated with BESS which can have major environmental and human impacts without appropriate mitigation. Understanding these risks should allow more informed comment to be made to planning applications.

Most BESS are based on lithium ion technology. These batteries have decreased in price by over 70% since 2010 and may well continue to get cheaper with more recent discoveries of large amounts of accessible lithium (eg in the USA). We should therefore expect more numerous and larger BESS planning applications in future.
Electricity from a BESS is inherently more expensive- it is generated elsewhere but has had to be stored in a very expensive box and basic physics means that the BESS will not give out as much energy as is put in.
BESS also attract capacity subsidies (paid for by UK electricity consumers). Capacity payments are paid as a retainer for power sources to be on 'stand by' to top up the grid at short notice – even if they're not used. Capacity payments are given to non VRE potential generators – such as hospitals and businesses with large diesel generators, coal and gas power stations as well as BESS – any power source able to provide electricity at short notice on demand.
Not only will BESS attract UK capacity subsidies, but they are able to sell their power to the grid at a time when the wholesale price will be at its highest – even though they will recharge at times of plenty when electricity prices are at their lowest. This is providing consumers with renewable electricity that is extremely expensive.
A windfarm operator gets constraint payments from National Grid not to produce electricity/turn off turbines at a time when the grid cannot cope either with excessive generation or there is low consumer demand (eg at night). If a BESS is directly connected to a constrained windfarm (as opposed to being connected via the National Grid), then instead of the windfarm shutting down, that constrained off electricity can go instead to charge their directly connected BESS, without the windfarm losing their constraint payment. The BESS gets also gets a capacity payment and is then able to sell the 'constrained off' power back to the grid at the highest price when demand is highest. The windfarm/BESS owner will therefore get two lots of public subsidies and the highest wholesale price for generating the same unit of renewable electricity which is eventually sent to the grid! And the politicians would have us believe renewable energy is cheap!

A few technical terms to understand the size and capabilities of a BESS:

- BESS Energy capacity is the maximum amount of stored energy (in kilowatt-hours [kWh] or megawatt-hours [MWh])
- Rated power capacity is the total possible instantaneous discharge capability from a fully charged BESS (in kW or MW), or the maximum rate of discharge that can be achieved.(This is not the same as kWh or MWh stored capacity)
- Storage duration is the amount of time BESS storage can discharge at its power capacity before depleting its energy capacity. E.g. a battery with 1 MW of power capacity and 4 MWh of usable energy capacity will have a storage duration of four hours.
- Like domestic lithium batteries, the more a BESS battery is charged/discharged, the shorter the battery life. BESS units are expected to last just over 8 years before they require replacing. Cycle life/lifetime is the amount of time or cycles a battery storage system can provide regular charging and discharging before significant deterioration or failure.

The largest BESS in the world (Vistra Moss in the USA – 1200MWh) may produce enough electricity to power thousands of homes for more than a day, but most BESS will provide electricity only for a few hours. The

largest BESS in the UK is currently (May 2023) 99MWh, costing £30 million, near Luton. The Vistra Moss entered service in 2021, but had to shut down due to overheating problems until 2022.

Like lithium ion batteries in phones, lap tops and cars, the BESS last longer if not fully charged or discharged. Therefore whilst capacity payments may be based on the overall capacity of a BESS, the reality is that the rated power capacity, what will actually be released when needed, will be significantly less to protect the BESS. Rapid charging or discharging will also cause the battery to heat up, risking thermal runaway, so the storage duration will also limit what can be released by the BESS in a short period of time.

Thermal runaway is a process of overheating due to a chemical reaction in the battery, which then affects adjacent cells in the battery producing an exponential heating event and eventually fire. This is increasingly being recognised as a major problem in other lithium batteries – such as the spontaneous vehicle fires causing ships transporting EV's to sink (Freemantle Highway July 2023 and Felicity Ace September 2022). BESS fires and explosions have occurred in several countries around the world causing death and injury to firefighters. Lithium ion battery fires and explosions are very difficult to put out, generating intense heat enough to melt metal and requiring very large volumes of water. In addition to releasing toxic fumes (which required warnings to stay inside and shut windows to local residents of a BESS fire in Liverpool in 2021), the water used on a fire reacts to produce corrosive and dangerous hydrofluoric acid- amongst other noxious components. This is extremely damaging to the environment.
BESS facilities should therefore have large volumes of water available on site for fire fighting as well as containment facilities for that water in the event of a fire, to prevent that contaminated water reaching water courses, drinking water supplies and the wider environment.

To avoid thermal runaway, BESS require air conditioning to be kept cool – thus consuming energy even if they are not in use.
Higher temperatures in summer months, especially during heatwaves, means more air conditioning and electricity use is required – even if the wind fails to blow and there is a power shortage.
Thermal runaway is more likely during extreme temperatures and so charging or discharging BESS may be discontinued due to safety concerns.
High humidity or water penetration to the battery increases the likelihood of thermal runaway. Winter months (especially in Scotland) can cause problems with very high rainfall, high humidity or water penetration, potential flooding and snow melt on top of BESS containers. (Perhaps BESS are not ideally suited to the West of Scotland!) Air conditioning units should therefore not only cool but dehumidify air within the BESS.
BESS containers should be kept at a regular temperature. Power cuts that might affect air conditioners could be disastrous. Of course, industrial air conditioning units themselves may cause noise disturbance to neighbours and should be questioned in planning applications if near to housing.

Because of the serious risks of often unpredictable thermal runaway from BESS fires – to the environment, local residents and to emergency services, it could be argued that opinion should be obtained from Fire and Rescue services to inform a planning decision.

If BESS applications are for temporary planning permission, details of restoration should be included so that concrete bases and cabling, as well as the multiple metal containers are eventually removed and land restored appropriately.

If we are going to have a grid based on intermittent renewables, it is no use looking just at the cost of generation. We have to add on the cost of energy storage, or some other kind of back-up. All are likely to be horrendously expensive. Storing energy in lithium batteries, for example, can cost around six times as much as generating it in the first place. Using gas as back-up – as we do now – means we have gas power stations sitting idle for some periods, pushing up the unit cost of generation when they are needed.

Finally, BESS are not electricity generators but are a short life electricity storage mechanism that consume electricity simply to function and consume non-recyclable materials such as lithium salts. They have potential to cause serious environmental damage and fire risk and do not improve biodiversity at all. Whilst they make VRE generators more viable in terms of evening out grid supply and stability, it could be argued that BESS have few other attributes listed under NPF4 that should favour supporting planning consent.

Battery Energy Storage Systems (BESS) applications often suggest that the applicant is either technically incompetent, or doesn't want you to know how big the proposed BESS will be. Giving the size of a BESS in megawatts (MW) is nonsensical. MW is a measurement of the rate at which electricity can flow into or out of the BESS. (Like the size of the pipe connected to a water tank). It tells you nothing about the SIZE of the BESS.

(The size of the water tank). For the size of a BESS, you need to know the number of hours for which the BESS will be able to produce electricity at the quoted rate. This is measured in megawatt-hours (MWh). A few other facts may be useful. One hazard associated with BESS is the potential for "Thermal Runaway" (TR). This occurs when an internal failure results in a chemical interaction commencing inside the battery. Unlike a fire, it does not require a supply of oxygen to continue. It therefore cannot be extinguished using existing firefighting techniques, which all work by seeking to deprive a fire of oxygen. The only emergency response currently available in the event of TR is to try to cool it using copious amounts of water to stop it spreading. The smoke and fumes given off during TR, and the run-off from the cooling water are both extremely toxic. The TR will continue until the chemical interaction between the materials inside the battery is complete, which may take several days. Spontaneous re-combustion can occur for a significant time after it seems to have gone out, It's useful to have an idea of how big the conflagration resulting from a BESS TR could be. In energy terms, 40KWh of electricity is equivalent to around 2-1/2 gallons of petrol. So TR in a BESS would be the equivalent of setting fire to around10 tons (!) of petrol for every 100MWh of the BESS's size! (Except, of course, you can extinguish 10 tons of petrol, but you can't extinguish a TR). So you want to be pretty careful where you go putting BESS's!!!

There are plans to put LI BESS on roofs, basements and even floor 13 of high rise flats.

LI BESS are remotely monitored

There is currently no independently validated means of extinguishing a Lithium Ion battery fire which gives off toxic and explosive vapour clouds.

The City of Westminster banned LEV's 2 years ago to protect its citizens – this has not been extended to other areas to protect the rest of us!

The fire brigade should be a statutory consultee as public safety should be paramount.

CPRE Dec 2024

Safety, fire risk and thermal runaway

In addition to the above concerns, safety is of paramount importance. Specifically the risk of fire and thermal runaway. Thermal runaway is a self-sustaining chain reaction by which the fire spreads. The BESS would have been comprised of hundreds of lithium-ion batteries, packed closely together in containers. Lithium-ion batteries can ignite or explode, thus initiating thermal runaway. Ignition can result from a number of factors, such as overheating, overcharging, external damage, inadequate ventilation, and electrical faults such as a short circuit or voltage imbalance. And the close proximity of the batteries in a BESS can contribute to the rapid expansion of a fire.

When thermal runaway occurs, toxic chemicals are released including Hydrogen Fluoride and Carbon Monoxide. Release of these chemicals can pose severe risk to emergency response teams and nearby communities, as exposure can lead to organ damage and could ultimately be fatal.
Thermal runaway incidents are not a theoretical concern. One study reported in PV Magazine documented over 50 significant incidents of fires and thermal runaway in BESS between 2018 and 2023. These included events in South Korea, the United States, Europe, and Australia.
One of the notable incidents occurred in Arizona in 2019. A cell defect in a battery at a 2 MW BESS caused thermal runaway, which then caused an explosion with serious injuries to firefighters and destruction of the entire BESS. Read more about this incident in Energy Storage News.

A BESS incident may require nearby local communities to shelter-in-place. In 2023, as reported by local media North Country Public Radio, a fire at a recently-constructed BESS facility in Lyme, New York prompted authorities to issue a shelter-in-place order for residents within a one-mile radius. Concerns included air quality impacts and the release of toxic materials as the fire continued to burn for several days.

Former MP and government minister Maria Miller has raised significant concerns about the safety of large-scale BESS in the UK. She has advocated for these facilities to be classified as "hazardous," which would require mandatory consultations with the Environment Agency, Health and Safety Executive, and fire services during the planning stages. She has also called for a review of current and planned BESS installations to ensure they do not pose undue risks to residents or the environment, and that they are located appropriately to avoid harm to nearby communities.
The National Fire Chiefs Council (NFCC) has previously issued guidelines regarding BESS safety features. These include provisions for fire service access, water sources, and emergency response plans. The NFCC is further revising its guidance on managing BESS-related risks to include requirements for safe site locations, expected for publication in 2025.

These efforts reflect a growing acknowledgment of the risks posed by BESS systems and the need to address public safety considerations.

Moss Landing fire: One of the world's largest battery factories ablaze

Story by Alex Croft 17 Jan 2025

More than 1,000 people are being evacuated after a blaze broke out in one of the largest battery storage facilities in the world on Thursday night prompting a full scale mobilization of firefighters across several counties in Northern California, according to local authorities.

Towering flames were visible from afar as a large black column of smoke rose from the Moss Landing power plant, with the fire showing no signs of easing in the early hours of Friday. It was first reported around 3pm local time.

The fire is located in the northern part of the sate some 300 miles (500 km) north of the wildfires in Los Angeles. The plant contains tens of thousands of lithium batteries, which can be extremely difficult to put out if they go up in flames.

"There's no way to sugar coat it. This is a disaster, is what it is," Monterey County supervisor Glenn Church told KSBW-TV. But the fire is not expected to spread beyond the concrete building it is enclosed in, he added. Highway 1, located nearby, has been shut down by authorities.

Vistra Energy is the largest power generator in the U.S. The company is listed on the Fortune 500. In 2020, a study found that Vistra was the highest CO2 emitter in the country.