

ISSUES SPECIFIC HEARING: 11 MARCH 2025
Submission by Pam Spreckley on behalf of HALT

HEALTH & SAFETY ISSUES RELATING TO BESS'S (AND SOLAR PANELS)

Our concerns are serious and twofold regarding BESS's, in particular issues of noise and fire when residential homes are as near as 575m from the intended site and within 1-1.5 miles of at least 4/5 villages with a combined population of over 4000.

1. NOISE

The Applicant has acknowledged that noise from BESS's could be problematic: "Infrastructure that has potential to create noise impacts (such as the BESS and on site substation) so have been placed towards the centre of the site, away from residential properties". (7.4.2)

However, the Applicants self imposed 5km radius restriction has greatly limited how far away the BESSs can be sited away from homes. The substation is also to be sited in the same area, again for convenience and cost saving to the Applicant but with no regard for the safety and health of residents in close proximity.

It must not be forgotten that residents are also having to endure fields of solar panels within the same vicinity and although the Applicant would have us believe there isn't noise from panels when static, this is inaccurate. The supporting infrastructure; inverters, transformers and cooling fans all produce noise output, especially in the numbers proposed - as will the rotating mechanism of the tracking panels to be used (despite the Applicant having dismissed this fact).

Evidence already exists that noise from solar farms is causing serious health problems for people living in close proximity.

e.g. ████████ in America (30.01.2025) revealed that local people in Monson, Massachusetts are suffering from tinnitus, nausea, headaches, insomnia and other mental health & anxiety issues having to endure a continuous noise 24/7 from a Solar farm constructed in 2018. Some describe the noise as "horrific" and so many are no longer able to enjoy a peaceful and healthy life in their own homes.

In comparison, noise levels from BESS's are even worse, especially from compressors and fans in the cooling systems. (*Please see details in Appendix 1a*)

The Noise Monitoring Services (March 2024) worked on noise studies for 13 BESS facilities from 2022 - 2024, mostly located in Southern California and Arizona, and are considered one of the leading experts in this specific area of noise control.

They state that BESS's often require implementation of **substantial** noise control measures to comply with city noise ordinance as generated noise levels from cooling systems range between 70 and 92 Dbs. The same will surely be the case in the UK.

Quieter transformers and inverters are available, but at a premium cost, so generally not a specification point the solar facility designers are willing to consider.

The second option for noise control would be noise barriers. One important matter to be aware of when using a noise barrier is that the primary sound from inverters and transformers is low frequency which results in sound with a longer wavelength. Noise barriers are less effective for longer wavelengths and then require a larger wall than might normally be expected.

The most aggressive sound control treatment for transformers and inverters is a full enclosure or even a building. Due to the heat generated by both devices, a forced-air ventilation system is almost always needed. The fans used in these cooling systems may be louder on an A-weighted basis than the electrical side of the hardware.

All of these measures will impact nearby residents.

Please find a summary of noise reduction measures in Appendix 1b)

*A particular concern we have is that, buried in the mountain of documents submitted by the Applicant, a senior acoustic consultant stated that, although they aim not to exceed background sound levels, “we may need to push for more lenient criteria where background sound levels become prohibitively low” – obviously confirming the point that problems are anticipated and raising our fear that corners will be cut or goalposts changed!

1a) General Questions

- i. Surely it would be the case that the cumulative impact of up to 76 units will lead to a noise nuisance, especially when it is expected that all fans over the entire facility could operate simultaneously over the 24 hour period and mindful of the prevailing winds towards residences and the village.
 - a. *Contrary to what the Applicant states, the Noise Monitoring Service have found that during hot weather, it can be expected that all fans over the entire BESS facility could operate simultaneously as the batteries charge or discharge together. This may occur any time at night or day and subsequently cause several hours of sustained noise at a constant level. This noise is often tonal and consequently the facility noise levels are held at a more restrictive noise level.*
- ii. How therefore can it be acceptable to allow BESSs (and solar panels) to be located so close to residential properties when a noise nuisance and subsequent health problems will be inevitable?
 - a. Note: The World Health Organisation (Submission ID: 28466) recommends that Solar Farms should be a minimum of 2 miles from residential properties with good reason!
- iii. There is concern as to the Applicants commitment (for reasons stated*) and these can only be assessed when the BESS's and panels are in situ. What happens if they are not satisfactory? What action can/will be taken at this stage? Who will enforce it?
- iv. How would the inevitable health issues and subsequent related costs be compensated?

In response to some of the questions raised above at the ISH2 hearing, the Applicant stated that a potential noise assessment has been undertaken and the findings approved by the local environmental health department.

The conclusion being that they do not envisage a problem and therefore no remedial measures are proposed. An approach the Applicant has used throughout this process with no guarantees. This is extremely worrying.

The Environmental Health department will have approved the findings, based upon potentially inaccurate data. Field studies provide guidance only and the reality may be significantly different.

1b) Further questions:

- v. The Applicant did not accept or was unaware that the fans across the entire site can operate simultaneously, therefore this scenario will not have been included in the noise assessment exercise. Please would it be possible for this to be done, to ensure a more accurate picture is achieved and for this to be presented to environmental health for an opinion?
- vi. The Applicant has obviously assumed that their assessments will be accurate and have therefore provided no assurance that remedial measures will be undertaken, should this not be the case. Please can we request that such assurance is given and that the Applicant is asked to specify the methods of noise control that will be considered if this is necessary?

According to the Control of Noise at Work Regulations 2005, those who are working in noise levels between 80dB and 85dB must be provided with suitable hearing protection on request. Where noise levels reach or exceed 85dB suitable hearing protection must be supplied and worn. Workers must not be exposed to noise levels exceeding 86dB, whether they are wearing ear protection or not. We, as residents are not classed as workers, but do we not appear to have rights too.

2. RISK OF FIRE/EXPLOSION

Background

The impact of BESSs is well documented:

- Risk of fire that is difficult to extinguish and, in many cases, has to be left to burn out
- Risk of explosion posing a health, safety and environmental risk (in Liverpool, the fire created “a significant blast”)
- Risk to health due to the toxic plumes and particulates emitted
- Run off and ground water contamination
- Risk to wildlife
- Noise impact (already covered)

Please see summary of impact of BESS's in Appendix 2a)

Evidence

There is also clear evidence of the damage that such fire/explosions can cause to public health and wildlife:

- Toxic chemicals such as cobalt, nickel, lithium and hydrogen fluoride have caused lung and breathing problems, skin damage, bone loss, injury to the nailbed, eye problems including blindness/ part blindness, and mental anxiety, all of which cause great discomfort and pain, and often long term damage or scarring. (I currently have access to a Facebook page for those effected by the Moss Landing Plant fire in the US and it is heart breaking to hear the physical and mental health damage they have and are still facing)
- ██████████, at the San Jose State University, sampled within a 2-mile radius of the Moss Landing Plant fire along the Elkhorn Slough marshy banks. He found lithium-ion component's (such as nickel, manganese and cobalt) were at concentrations thousands of times greater after the fire and consequently “the implications to wildlife hang in the balance”

Research re BESS facilities

In a recent paper ‘Gridscale Batteries and Fire Risk’ 2024, ██████████ (who has served 20 yrs in the Civil Service and as an EU scientific logistics consultant, with a doctorate in nuclear physics) undertook a study of BESS fires across many countries including the US, Australia, Asia and New Zealand. He refers to battery storage systems as “unexploded bombs” (A fully charged 1-MWh BESS has an explosive potential equivalent to 0.86 metric tons of TNT, a 1600-MWh is thus equivalent to near 1400 tonnes of TNT). Added to this is that no test currently exists to assess the response to an internal short circuit which has been the cause of many of the fires.

NOTE: A recent paper by ██████████ et al concluded that “no chemistry, not even less reactive LFP lithium-ion chemistry, is exempt from thermal runaway”

Consequently, ██████████ states that it is agreed that all battery storage systems are likely to have **at least one fire during their lifetime** and that such fires can, and have, happened spontaneously and without warning presumably due to the lack of current technology to avoid the risks completely.

Even more worryingly, ██████████ highlights the complete absence of standards or regulations governing BESS facilities in the UK and warns that, until strict regulations relating to the development, installation & maintenance is introduced there should be a **moratorium** on all BESS projects.

Surely the rush to reduce carbon emissions and decarbonise the electricity grid must not override public safety?

██████████ concludes that BESSs are “large and unstable concentrations of energy and thus their presence near human habitation brings major risks, particularly from fire”.

Government Response

In a House of Commons briefing paper April 2024, the Government highlighted the risks associated with BESS's: fire, explosion, toxic plumes, run off, ground water contamination and noise impacts. However, moves to introduce regulations governing BESSs were shelved due to the snap election in July 2024. Only very recently have BESSs gained greater scrutiny, due to the rising number of increasingly larger BESS sites and the increased risk and frequency of fires.

There is now a strong indication that BESS's will soon be included in the Environmental Permitting Regulations 2016, where a permit will be required to operate in the future.

However until this comes into being, we have to rely on the Applicants "professional integrity" to carry out the work safely.

How can we rely on the professional integrity of the developers when they have no **specific** regulations to adhere to. Reliance on manufacturers operational risk information and hazards associated with the BESS were considered inadequate in a report by the Merseyside Fire & Rescue Service re the Carnegie Road fire in Liverpool.

It is also important when considering the Helios project, that account is taken of the cumulative impact of already having a newly constructed 100MW BESS facility at Drax.

The Applicants Response

Pre ISH2 hearing

- Abbott Risk Consultancy Ltd in its recently submitted report (ARC-1275-006-R1), states that there has been ONLY ONE BESS fire in the UK (Liverpool 2020).

This is a microcosmic view and as such gives the illusion that BESSs are relatively safe. Instead, it is absolutely clear that the spread of BESS's over the past 10 years worldwide has led to the increased frequency of spontaneous fires. As of July 2024, there have been 89 such fires across the world, with horrendous outcomes and resultant danger to health of toxic fumes and particulates and involving the need to lockdown and/or evacuate persons in some cases up to a six-mile radius. NOTE: There have also been two more recent fires in the UK; one at a battery storage facility near Rothienorman in Aberdeenshire on the 21/02/25 and one in East Tilbury, Essex, on the 19/02/25 where BESS's are under construction.

Please see summary of cases in Appendix 2b)

- Abbott Risk Consultancy Ltd in its recent report ARC-1275-006-R1 concludes that "all currently foreseeable hazards associated with BESS equipment have been identified and actively managed"

How can the Applicant make such a sweeping statement about an issue that could potentially have a catastrophic impact on local residents and wildlife?

We still await the number of BESS's, the Applicant is currently unable to provide details regarding key elements such as suppression, detection and monitoring systems and we have yet to receive any feedback from North Yorkshire Fire and Rescue Service (NYFRS).

At the ISH2 Hearing

- i. In response to questions raised, the Applicant, as always, offered general reassurances that their health and safety measures would meet all the relevant requirements existing, nationally and globally.
- ii. They also countered the issue re the number of fires worldwide by stating that there have only been 3 fires in the U.K. over the last 10 years (accepting that the 'only one fire' referred to in the Abbott Risk report was inaccurate) and that all were well contained thanks to the response of

the local Fire and Rescue teams. Further that the research undertaken by [REDACTED] didn't include the fire in Liverpool (the other 2 fires occurred after the report was published) and therefore has less validity

- iii. The Applicant stated that there had been no engagement with North Yorkshire Fire & Rescue Service (NYFRS) apart from a brief communication in the early stages, when the Service referred the Applicant to the NFCC Planning Guidance.

I would like to respond to these points;

- i. Such reassurances offer no guarantees that standards will be met. Also the main body they referred to, the Construction (Design and Management) Regulations, govern the way construction projects of all sizes and types are planned. They do not specifically relate to BESSs. Additionally, many documents are guidelines only and as such can be ignored.
- ii. The research carried out by [REDACTED], a person with excellent credentials, included BESS fires in numerous countries such as the USA, Australia and Asia, and where BESSs have been in place for much longer periods of time & therefore offer more mature data to explore. Surely, this research has as much if not more validity than a comparison of three fires in the U.K.?
- iii. One of the concerns many fire and rescue services have is that they are not statutory consultees. However, as [REDACTED] (West Yorkshire Fire & Rescue Service) stated "we do encourage providers to engage with us early to ensure that they are well managed and have robust emergency plans in place". When an application was made in West Yorkshire in July 2023, regarding a proposed BESS facility of 60 containers on the Heath near Wakefield, the proposal was rejected as a result of fears expressed by WYF&R of the risk of fire and explosion, and problems with modes of extinguishing. Should a fire break out the 2 options were to let it burn, hence significantly affecting the local population or using 5.5m litres of water but with the risk of a chain reaction from one unit to another"
Fire chiefs particularly identified the risk of vapour cloud, thermal runaway and explosion which "are becoming more common as we see an increase in the number of BESS installations rise"
It appears that no meaningful or detailed consultations have taken place with NYFRS in the planning stage of this project or in the ongoing process, which is of great concern.

2a) General Questions

- i. Surely the housing of such a large quantity of BESSs so close to human habitation is far too dangerous – at the very least shouldn't the resiting and/or a significant reduction in number be considered? Should the self imposed 5k radius be extended?
- ii. If they do go ahead, would the Applicant be required to provide a formal safety code, a structured set of safety documentation, providing evidence that hazards have been fully addressed and that residual risks have been reduced to render them as low as reasonably practicable (ALARP) – similar to that required in the nuclear industry and as recommended by [REDACTED] ("Gridscale Batteries and Fire Risk" 2024) or would they be required to meet the emerging standards to achieve a permit to operate? i.e. risk assessment and management, site design, operation, waste management and pollution control measures
- iii. Assuming the site would be remotely monitored, by what means would this be achieved and what contingency plan would be in place in case of signal failure?
Also a learning point from the fire in Liverpool was that due to the site being remotely operated by a Danish company, there were delays in instigating switch off and implementation of electrical safety measures.
- iv. Abbott Risk Consultancy Ltd refer to BESSs being a minimum of 25m away from occupied buildings. Does "occupied building" in the NFCC recommendation actually refer to a residential property where people live 24/7 or include buildings occupied by horses, cattle or other livestock? It should

also be noted that the blast radius from the fire in Liverpool was 23m which brings into question the efficacy of this recommendation.

- v. Which body locally and independently would be equipped to and would monitor the installation and maintenance of BESS facilities in the absence of UK standards and regulations?
- vi. When these fires break out and cause lockdowns, possible excavations, physical, emotional & mental health problems of residents affected, who or which body would be held accountable and/or compensate for lost; life, health, homes, income and alternative accommodation & home repair costs as well as any leakages into the soil and waterways? Can the Applicant demonstrate adequate insurance or indemnity is in place for such a scenario?
- vii. DISPOSAL
Finally, the Applicant states that batteries would be renewed multiple times in the 40 year cycle.
 - Exactly how would these be disposed of?
 - The statement in the recently submitted document ENO10140-000813 “Info to Inform a Habitats Reg. Assessment” vaguely states:
“all equipment will be removed and recycled or disposed of in accordance with good practice and market conditions at that time”.
 - There have already been fires reported at a recycling disposal site recently in Perth, Scotland caused by the small lithium batteries. The disposal of much larger batteries will be even more problematic.
 - Surely, we need greater clarity now as to how this hazardous equipment is to be disposed of rather than promises that may not be fulfilled, especially if the current Applicant is no longer involved? Failing to handle waste correctly would also be hazardous to the health of those living nearby.

2b) Specific Questions following the ISH2

- viii. Of the 150 – 200 BESSs in the UK how many are a similar size and output to the BESS proposed?
- ix. How long have these larger BESSs been in operation?
- x. Is there any meaningful evidence at this early stage of their development to suggest the newer, larger BESSs are safe?
- xi. Does the Applicant accept that internal short circuiting (especially when there are currently no tests to its response) can occur at any time so however well designed and constructed they are, these errors can occur and cause overheating with the subsequent risk of fire or explosion?
- xii. Does the Applicant accept that fires are likely at least once during their lifetime (10-15years) of a BESS and if not, how do they justify this assertion if BESSs of this size are still in their infancy and have not been operating for long enough to test this theory?
- xiii. The Applicant refers to the response of the F&R services and how adherence to the CRFC guidelines enabled the fires to be contained. Merseyside F&R arrived at the site within 10 minutes, yet the fire still blazed for 59 hours. How confident are they that NYF&R has the resources to be able to respond likewise being the largest county by area (8654 km²). As time is of the essence to prevent thermal runaway, this issue is critical.

Cumulatively this is all extremely worrying, especially as the Applicant is intending to house such a large number of BESSs so close to human habitation. If [REDACTED] is correct, as only time will tell, and even if each BESS is replaced at 15 years, in the 40 years of intended operation it could equate to over 200 fires if each BESS had one fire during its lifetime.

Until such regulations are in place, and assurances of strict adherences to them guaranteed, this is nothing more than industrial sized experimental site which is gambling with the lives of thousands of people living in the surrounding villages.

APPENDIX

1a) Example of Noise Emanating from BESS's (Noise Monitoring Services)

- Rechargeable battery units, which include cooling systems, can produce noise levels up to 92dB 1m away, especially during hot weather when all fans can work simultaneously
- Power Conversion System (PCS) - typically one PCS unit for each group of six or eight battery units – which contain fans that can produce significant noise in addition to a hum and electronic noise – up to 85dBs
- Transformers: BESS facilities may have one or two large transformers that produce a constant hum. Typical noise levels for transformers are lower than the batteries and PCS units, producing a level of about 75 decibels at 1 m from the equipment

1b) Examples of Sound Reducing Measures

- Re-orientation of equipment to direct sound away from the residences, using noise modelling, can quantify the noise reduction that would be achieved by rotating equipment 90 degrees and demonstrate the efficacy of this solution.
- Installation of a 20-foot-high sound wall between the BESS equipment and the nearest residences. The wall installed was a Sound Fighter Systems SonaGuard barrier, which is a high-performance acoustically absorptive wall.
- Reduction in battery fan speed e.g. fans operating at 50% of the maximum speed to achieve the noise limit and has the added benefit of making the battery fan tone less prominent.
- Custom silencers fitted on all battery fans and PCS intakes and vents. Battery fan silencers consisted of a duct lined with 2-inch acoustically absorptive foam and an acoustic louver mounted on the end. PCS units needed the same type of silencer on the fan intakes in addition to a long duct silencer around the top of the unit into which the vents discharged.
- Installation of acoustically absorbent foam lining the inside PCS air intake cavities. This material was installed to reduce the build up of sound inside the cavity and further lower the noise escaping through the intake.
- Balancing noise emissions of equipment to mask the battery fan tone. Our noise measurements and modelling revealed that the tone produced by the battery fans could be effectively masked by the broadband PCS intake and vent noise so long as this source was not reduced in level too much.
- Also to include advanced monitoring systems, fire suppression technology and strict thermal management controls and strict compliance with international safety standards.

2a) Summary of the Impact of BESSs

- Health & safety risks posed by BESS fires that are difficult to extinguish. The fire in Liverpool in 2020 took 59 hours to extinguish
- Risk of explosion posing health & safety and environmental risk – From Merseyside Fire & Rescue the fire “created a significant blast”
- Pollution caused during fire control measures to watercourses leading to aquatic life fatalities and long-term damage to the ecosystem
- Toxic fumes emitted in a fire including NO₂, HF, HCN, POF₃, SO₂ & ultrafine particles of Di lithium monoxide (Li₂O) & lithium hydroxide (LiOH) harmful to human health & wildlife health. Evacuations would be required.
- Potentially insufficient firefighting resource to control a fire from a BESS in North Yorkshire.
- [REDACTED] evident in supply chain: mineral extraction and production
- Deforestation in Africa due to mineral extraction mining for renewable energy. An area the size of Netherlands being cut down every year. These forests are a natural carbon sink, home to indigenous people & endangered wildlife

- 7 primates are now threatened with extinction due to mining for renewable energy minerals
- Biodiversity in the UK is at 50% of the 1970s levels. Destroying more habitat to erect BESS is adding to the pressure on UK wildlife
- Evidence of tinnitus, headaches, insomnia, nausea and sickness for people living close to BESS
- House value depreciation when living within 1.5 miles of a BESS

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2b) Case Studies of BESS Fires

- Lister Drive Grid substation (Image: Andy Teebay/Liverpool ECHO)
BESS fire in the UK, which took place in Liverpool during September 2020.
The initial cause of the fire in Liverpool was deemed to be “accidental ignition caused by lithium battery failure transitioning into thermal runaway”.
The Ørsted-owned 20MW system on Carnegie Road caught fire during the night and was alight for several hours. The facility had no permanent staff based at it, with nobody on site at the time. One of four shipping containers containing the batteries exploded, with debris scattered over a range of 23 metres, according to a report into the incident.
That report, from the Merseyside Fire and Rescue Service, concluded that the manufacturers’ operational risk information available for responding crews and the hazards associated with BESS was inadequate, while also noting that as the site was remotely operated by a Danish company, there were delays in instigating switch off and electrical safety measures.
The cells of the BESS are susceptible to 'thermal runaway' - the condition when an electro-chemical cell increases its temperature through self-heating in an uncontrollable fashion and progresses when the heat generation is at a higher rate than it can dissipate, potentially leading to off-gassing, fire, or explosion.
"Although an automatic fire alarm system was present and actuated due to the ignition of flammable gases inside the BESS unit, it did not prevent the fire or the significant blast event," stated the report.
"The result is evidently a vapour cloud explosion caused by the use of a conventional inert 'clean-agent' fire suppression system which blankets the thermal runaway event and prevents combustion,

whilst allowing major quantities of flammables to build up," it continued, adding: "When finally mixed with air and ignited this creates a major explosion."

- Moss Landing January 2025; 300MW battery installation, a fire burned for 3 days, over 3000 residents evacuated, most of the batteries in the affected building were burned. Several incidents had occurred previously to this fire.
- Moorabool in 2021 at a 350/450MWh site, a fire broke out that burnt for 3 days producing considerable toxic smoke and a warning was issued to a 30km area.
- The fire at Elon Musk's Big Battery in Australia led to homes six miles away in lockdown to protect residents from the fumes
- Fire broke out at a battery storage site in East Tilbury on 20/2/25. The site is under construction and consists of multiple containers housing battery units. The fire was caused by a fault in one of the battery cells within a single containerised battery unit leading to ignition.