

1 Introduction

I am an interested party living in West Lindsay who will be impacted by all the solar NSIPs destined for this area. I try to attend as many Hearings as possible, but I was not able to attend the Issue Specific Hearing on 15th January 2025 due to work commitments outside this area.

I have viewed the recording of Issue Specific Hearing 3 and wish to make the following points.

2 Item 3a - Impact on Health

I found the evidence presented by Mr Stansfield compelling and fully support the points he made. 7000 Acres has presented evidence from experts, such as Mr Stansfield, and other health professionals with expert local knowledge. The Applicant does not appear to have used a health expert in their determination of the impact on health and so their submissions should be given minimal weight compared to the expert evidence submitted by 7000 Acres.

In answer to the ExA's question about how the Applicant has assessed each aspect of health in isolation, I wish to make the following comments. By assessing each aspect (visual, noise, traffic etc) in individual silos, the Applicant has not taken account of the cumulative effect of the various aspects within their own scheme. Furthermore, they have not conducted a competent assessment of the cumulative impacts of all local schemes on health. As Mr Stansfield said, the loss of visual amenity will have a devastating impact on the mental health of the local population; this is a regional impact due to the 10,000+ acres of local solar NSIPs.

3 Item 3a - Battery Energy Storage System (BESS) Safety

I am an aviation safety consultant, and former RAF and civil experimental test pilot. I have been involved in the certification of aircraft systems for over 30 years. Due to my background in the analysis of safety systems and system certification, I watched the Applicant's BESS specialist, Mr Gregory, with particular interest.

3.1 Accident Dataset

Mr Gregory chose to only apply UK data during his safety summary. As the testing and certification standards applied to BESS components are international, then it is valid to use worldwide statistics, especially as the battery units will be manufactured abroad to these international standards and not unique UK requirements.

3.2 Probability of a BESS Thermal Runaway

I wish to clarify the units of analysis Mr Gregory used in his explanation of the probability of a BESS incident. He stated that there were 548 years of BESS operations in the UK. This is from 92 sites during the period 2018 to 2023.

One failure in 548 years is an **annual failure rate of 1.82×10^{-3}** ($1 \div 548$). The Applicant seeks consent for 60 years, so even using Mr Gregory's limited accident dataset, results in a probability of a BESS thermal runaway of **0.11 or 11%** ($1.82 \times 10^{-3} \times 60$ years). In reality, this probability is higher as not all of the 92 BESS sites were active for the whole 6-year period and so the denominator he used in his calculations will be smaller than 92 for many of the 6 years.

In my opinion, by quoting an hourly failure rate of 2.11×10^{-7} Mr Gregory was not helping the Inspector and might have inadvertently misled many in the Hearing as to the probability of a thermal runaway during the life of the Tillbridge Scheme. Quoting an hourly failure rate for a system designed to be in existence for 60 years is very unusual.

Applying Mr Gregory's hourly rate of 2.11×10^{-7} over the life of the scheme still results in a probability of a thermal runaway of 0.11 or 11%. ($2.11 \times 10^{-7} \times 60$ years \times 365 days per year \times 24 hours per day). An 11% probability of a thermal runaway during the lifetime of the scheme cannot be regarded As Low As Reasonably Practical (ALARP), as he stated. Certainly, an 11% risk of an explosion and/or fire during the life time of a single system would not be acceptable in the aviation, oil, chemical or transport industries.

Mr Gregory stated that the failure rates of individual battery cells is falling, which is accepted. However, due to the increasing number of batteries being used, the failure rate of the overall BESS system is likely to remain unacceptably high.

3.3 BESS Certification Standards

The Applicant's Framework Battery Safety Management Plan quotes various international standards, such as UL 9540A. Investigations into serious accidents, such as the thermal runaway at the Victoria Big Battery Project in July 2021¹, note that some test criteria are weak: for example, UL 9540A only requires module to module propagation testing in wind speeds up to 12 miles per hour. In the case of the Victoria accident, the winds were blowing at 36 miles per hour and the initial thermal runaway propagated to a second unit.

The UK Government has published Guidance in their document: Health and safety in grid scale electrical energy storage systems (Department for Energy Security and Net Zero, 2024). The Applicant does not appear to have addressed many of the recommendations in the report, and has not referenced it in APP-225.

Mr Gregory discussed the Emergency Response Plan (ERP). As part of his explanation he stated that local wind speeds, leading to "*flame tilts*" would be taken into account. Bearing in mind that some standards, such as UL 9540A, do not take into account typical wind speeds, what Standards will be applied by the Applicant when developing the ERP?

3.4 Quality Standards

The Clean Energy Associates (CEA, February 2024) reported that:

¹ <https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/projects/EN010106/EN010106-004097-DL2%20-%20Edmund%20Fordham%20EF20.pdf>

“the past several years have shown that Thermal Runaways pose a significant risk to the energy storage industry”.

It reported that 26% of inspected storage systems had quality issues related to the fire detection and suppression systems. Quality issues in the thermal management components were found in 18% of systems. These audits covered 30GWh of Li-ion energy storage projects, which included 64% of the Tier 1 BESS cell manufacturers worldwide, with 1,300 + manufacturing issues identified. The Report summarised their findings:

“The large number of system-level issues is mainly caused by the following two contributors:

- *The BESS integration process is highly manual and labor (sic) intensive, with less stringent quality control procedures.*
- *Systems are very complex and are vulnerable to underlying problems originating from defects in upstream components that were not caught during earlier quality checks.”*

The Applicant’s Framework Battery Safety Management Plan (APP-225) is very high level. It does not currently assess dormant failures, such as thermal protection or fire suppression systems failing to operate.

The Battery Management Safety Plan does not provide any real detail on the sub-systems they intend to use. Furthermore, many of the mitigations for Thermal Runaway they cite, such as thermal management, fire detection and suppression, have a very high industry failure rate that would not be permitted in any other high-risk environment.

3.5 Time Span of BESS Accidents

Mr Gregory cited the Liverpool BESS fire in 2020. In that case, a Thermal runaway led to the total destruction of one container out of four, so 5 MWh worth of storage produced a major explosion. Once water was applied, the resulting run-off contained Hydrofluoric Acid (HF), a highly toxic substance which can dissolve concrete and

whose fumes can be fatal to life. Defensive firefighting was required for 59 hours. The Merseyside Fire and Rescue Significant Incident Report (Merseyside Fire and Rescue) found that the automatic fire suppression system failed and that a significant blast occurred. The local fire hydrants were inadequate to meet the needs of the firefighting .

Mr Gregory quoted a typical period of 4-8 hours for a BESS thermal runaway. This timespan does not seem to be consistent with many thermal runaways that have occurred world-wide.

3.6 Fire Fighting A BESS Thermal Runaway

The Applicant has not explained how the 1,900 litres of fire water per minute for two hours, as required by the National Fire Chiefs Council Guidelines, will be provided to each BESS location.

3.7 Summary of BESS Concerns

I am concerned that the Applicant has not provided a clear and comprehensive explanation of the intended design for their BESS. I accept that a Rochdale Envelope may be applied to the scheme, but PA 2008 Advice Notice Nine Paragraph 2.3 states:

“the need for ‘flexibility’ should not be abused:

“This does not give developers an excuse to provide inadequate descriptions of their projects. It will be for the authority responsible for issuing the development consent to decide whether it is satisfied, given the nature of the project in question, that it has ‘full knowledge’ of its likely significant effects on the environment. If it considers that an unnecessary degree of flexibility, and hence uncertainty as to the likely significant environmental effects, has been incorporated into the description of the development, then it can require more detail, or refuse consent””

I believe the current description of the scheme is inadequate.

Even applying the Applicant's own failure rates, it is a foreseeable event that a BESS Thermal Runaway will occur during the 60-year life time of the scheme.

Industry audits have shown that there are a large number of quality issues with the BESS components. Some of these quality issues are associated with thermal management and fire suppression, both of which the Applicant uses to mitigate the high probability of a Thermal Runaway or fire during the life time of the project.

As a BESS is not an essential element of a solar generation scheme, as demonstrated in the Mallard Pass DCO, it is requested that the ExA does not consent a BESS as part of the Tillbridge Solar Scheme, given the lack of evidence provided by the Applicant, and the unacceptably high failure rates of BESS.

4 Works Cited

CEA. (February 2024). *Clean Energy Associates Insights - BESS Quality Risks*.
Clean Energy Associates.

Department for Energy Security and Net Zero. (2024). *Health and safety in grid scale electrical energy storage systems*. HM Government. Retrieved January 25, 2025, from <https://www.gov.uk/government/publications/grid-scale-electrical-energy-storage-systems-health-and-safety/health-and-safety-in-grid-scale-electrical-energy-storage-systems-accessible-webpage?fbclid=IwY2xjawIB2DhleHRuA2FibQIxMQABHV9wqbWXZRkCQmr u9Tvy7rvPgqO>

Merseyside Fire and Rescue. (2020). *Significant Incident Report Orsted BESS Liverpool*.

