

Fire Hazard and BESS installation proposals at Grendon

1. This submission concerns issues relating to fire hazards associated with BESS installations and risks that arise. Although this issue has already been raised with the examiners, further information has come to light which has not been presented and to which we wish to raise attention.
2. The first issue concerns the increased frequency of fires associated with solar installations and was published by QBE Europe, a firm of global business insurers. (The report is available at: <https://qbееurope.com/news-and-events/press-releases/uk-fire-services-tackle-a-solar-panel-fire-every-two-days;>)
3. Although much of the data collated in the QBE report concerns domestic installations, the report identifies the sources of fires, and these are listed in the following tables:

Table 1: Solar panel fires by source, 2024:

Number of solar panel fires in 2024, by reported location	
Residential buildings	97 fires
Commercial properties	27 fires
Solar farms	17 fires
Industrial buildings	10 fires

Source: QBE FOI (Aug 2025)

Table 2: Solar panel fires by origin:

Origin of solar panel fires in 2024	
In the inverter	21 fires
On the solar panel	20 fires
DC cabling	16 fires
Battery bank	12 fires

Source: QBE FOI (Aug 2025)

4. The report states that, because data was provided by only 37 out of the 49 national fire services the incidence is likely to be somewhat higher than those reported on the tables quoted.
5. Although the report also acknowledges that the reasons behind these fires may lie, in many instances, with poorly installed equipment, it also highlights that there are heightened risks associated with the inverter which, they state, “is the hardest-working component in a solar panel system”. However, whilst poor installation may be a cause, the report also underlines the dangers arising from external factors such as high winds or prolonged heat.
6. In view of the increases in these hazardous events the question of the BESS installation, its structure and potential risks, is important to consider further. Two key points are raised: One relates to the closeness of proposed battery units to each other and the second to the issues of run-off arising from the fighting of any fire that occurred.
7. With regard to the battery unit installation we have noted, through advice, that the proposed containers required for the storage of the required energy quotients could mean that, as calculated from documents APP-205 and APP-206, the distance between the battery storage units could be 1 metre or even less. We accept that these suggested distances are estimates because the applicant is not required to submit final specifications at this point. However, these are best calculations based on available information and we invite the applicant to provide more specific detail.
8. The spacing of battery storage units is relevant to the information provided above about the increased fire risks. In the event of any battery fire the chemical constituents of any pollutants, and the potential area of dispersion, are fundamental issues. We quote, below, relevant academic studies to support our concerns. Most fundamentally these studies highlight the health risks to those living near to BESS installations and inverters. In previous documentation the applicant has only referred to large particles in the fire plume of PM10 size. However, it is the smaller

particles of less than PM1 that are of most concern because these travel further and are more toxic. We invite the examiners to request information as to what particles and gases are in the plume, which will also be a good validation of the test procedures being relied on.

9. We wish to draw further attention to the potential for run-off from any fire or fire-fighting activity associated with the BESS and inverter installations. The volumes of water that could be used may be huge. Again, an academic study is quoted to support our concerns associated with the immediately adjacent SPA and RAMSAR site.
10. The bunding of any water from potential run-off is acknowledged, but the applicant should be asked to provide details of how and where any such contaminated waters would be disposed of to avoid pollution either locally or elsewhere.
11. Lastly, an issue that has not been evidenced during the enquiry concerns the potential impact of any pollutants that may affect the local ecology. The proximity of the SPA and RAMSAR designated sites has been documented during the examination together with the biodiverse environment being hosted. There has been no evidence presented regarding the impact on wildlife of any toxic escapes. We would ask the examiners to take a cautious approach to the assessment of this issue.

Concluding questions:

- A. Can the applicant confirm that the estimated density of battery storage units (i.e. 1 metre spacing) in the BESS sites is a reasonable estimate if the target generation figures are to be achieved?
- B. Does the applicant recognise the potential risks, not only of particulates but of nano-particulates (Less than PM1) that may be present in the plume arising from a fire at BESS or Inverter sites?

- C. Can the applicant confirm that the compounds ethyl ethylphosphonofluoridate, ethyl methylphosphonofluoridate, and methyl methylphosphonofluoridate could be detected in the gases vented from a realistic assessment of a lithium-ion battery thermal event?
- D. Could the plume from any fire contain organophosphates (i.e. nerve agents)?
- E. Has the applicant considered the potential impact of any toxic escapes on the natural life within and beyond the adjacent protected areas?

We request that the examiners seek unambiguous responses to these questions and that such evidence is fully accounted in assessments of BESS and inverter locations, particularly in view of proposed proximity to human habitation.

References:

- Bergstrom, U., Gustafsson, A., Hagglund, L. et al. (2015). Vented Gases and Aerosol of Automotive Li-Ion LFP and NMC Batteries in Humidified Nitrogen under Thermal Load. Report no FOI-R-4 166-SE.
- Bordes, A., Papin, A., Marlair, G. et al (2024). Assessment of Run-Off Waters Resulting from Lithium-Ion Battery Fire Fighting Operations. *Batteries* 2024, 10, 118 (<https://doi.org/10.3390/batteries10040118>)
- Claassen. M., Bingham, B., Chow, J. et al. (2024). Characterization of Lithium-Ion Battery Fire Emissions – Part 2: Particle Size Distributions and Emission Factors. *Batteries* 2024, 10,366 (<https://doi.org/10.3390/batteries 10100366>)
- Mrozik, W., McDonald, J., Shuttleworth, E. et al. (2026). Performance of Extinguishing Agents against Lithium-Ion Battery Fires. *Fire Technology* (2026) 62:3 (<https://doi.org/10.1007/s10694-025-01831-w>)