FAQ NOTE: INVERTERS IN LOFTS (+ BATTERIES INSIDE)

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1 THE VERY SHORT ANSWERS

1.1 BATTERIES INSIDE

Since the publication of PAS 63100:2024 you can **assume that batteries will need to go outside the dwelling (and not be in the loft space).**

It is possible to put batteries inside the home, but the requirements to do this and still comply with PAS 63100 mean that it is typically impractical to do so. Note that compliance with PAS 63100 is not mandatory or specified within PAS2035 – but see Section 2 below! We are recommending that PAS 63100 is followed for battery installations.

1.2 INVERTERS IN LOFTS

If you put inverters in the loft then we would recommend that (compliant) smoke detection is present.

2 IMPORTANT CONTEXT – HOW REGS AND GUIDANCE WORK!

This 'context' is important because it is probably more useful in framing the answers than the technical detail of what is, or is not, or might be, mandatory! Most of what we would think of as 'clear rules' in Building Regulations are in fact not absolutely mandatory as there are escape routes. In practice this probably makes the weight of guidance, and regulatory pointers more relevant than anything else. In other words you might say that things become 'effectively mandatory'.

There are levels of guidance and regulations. For example PAS 2035 is not 'mandatory', it is guidance. However, meeting the guidance is required by the funder. This elevates the standing of PAS 2035 for the DESNZ retrofit projects. It becomes mandatory for funding. However, in day to day operational practice TrustMark's interpretation and requirements effectively trump the words in the PAS2035 document. This means that what is effectively enforced is not necessarily what might be expected from the words written in the document. This begs a question: "*Should you be following the words in PAS 2035, or should you just be making sure that you have ticked all the TrustMark boxes?*"

The Building Regulations *are* mandatory. However exactly what is mandated is less clear. If we take Part F (Ventilation) for example. The Part F doc is *c.*62 pages long. Most of the document details what you must do in order to be deemed to have met the requirements – in detail. However there are three routes or approaches. The document details the first two.

The third option though is effectively a 'back door' to just do something else. This is contained in two paragraphs (a general one, and one for retrofit specifically) containing a total of 6 lines of text. This is done so the Regs are not a restrictive straight jacket that prevents any other solutions.

However, it does provide a back door which can be used to arguably avoid the details set out in the document and deploy a lesser solution.

The contextual challenge is that it isn't always easy to be crystal clear about exactly what is mandatory. But whilst it may be possible to do something that it might be possible to argue is not 'mandated' – the further away that solution is from what is clear in the various docs, the higher your exposure to risk if something does go wrong (or there is a complaint) and you are left trying to explain why your solution is an allowable 'complicated explain', rather than a simple following of the guidance / regs.

This means that what AECL will recommend for MNZH consortia members will typically be driven by what we think you should do, for a combination of clear compliance and good practice.

We are therefore saying:

- Don't put batteries inside the home
- Inverters in lofts need smoke detection

We are not necessarily saying that these things are absolutes or clearly mandatory.

3 Primary 'Regulations' and Guidance

3.1 Primary Docs

- PAS 2035:2023 Retrofitting dwellings for improved energy efficiency – Specification and guidance
- PAS 63100:2024 Electrical installations – Protection against fire of battery energy storage systems for use in dwellings – Specification
- BS 5839-6:2019+A1:2020 Fire detection and fire alarm systems for buildings
- Building Regulations, Approved Document B, Volume 1 (Dwellings), Fire Safety.

This is by no means an exhaustive list! There are definitely other documents that we could have added here.

Why 'Primary'

Regulations and guidance documents generally work as an interconnected 'framework'. All such documents will refer to other documents. For example in PAS 2035 it says:

"*The following documents are referred to in the text in such a way that some or all of their content constitutes provisions, or limits the application, of this document*."

It then lists 23 such documents – and this does not include building regulations.

We have used the 'Primary' reference docs above to help answer the questions – but a full review of all relevant docs would need to be much deeper! However the answer can normally be identified from the most relevant docs.

4 LONG ANSWERS

4.1 BATTERIES INSIDE

PAS 63100 is guidance, it is not mandatory.

The following is right at the start of the PAS document in **Section 0 Introduction**:

"**Regarding battery location, the basic premise is that the best place for storage batteries is outside dwellings**"

4.2 INVERTERS IN LOFTS & SMOKE DETECTION

AECL recommends that:

- Inverters are not located in lofts.
- If inverters are located in lofts the smoke detection should be present.
- Smoke detection should be linked to the system within the dwelling i.e.
    - Not be reliant on a battery for power
    - Should have battery back up
    - Be fully audible within the dwelling

4.2.1 Quotes from the guidance (& notes)

4.2.1.1 BS 5839

This British Standard is guidance, it is not mandatory. However the standard is referenced in Part B (Fire) of Building Regs – which at least strengthens its standing.

- Section 11.1.1 Category LD systems
    - *"In 2019 it is increasingly common for electrical equipment to be installed in loft spaces, particularly in premises fitted with photovoltaic power systems and other plant (e.g. boilers**). In such cases, a Category LD2 system needs to incorporate a smoke detector within the loft space**."*

4.2.1.2 Building Regs Part B

- Section 1.1
    - "*All dwellings should have a fire detection and alarm system, minimum Grade D2 Category LD3 standard, in accordance with the relevant recommendations of BS 5839-6.*"
        - "Should" in Building Regs is basically a recommendation not a core legal requirement. (That would use words such as 'shall' or 'must').

All the pointers are that having an inverter in the loft should also mean fire detection in the loft. Following the instructions in the Regs (fire detection linked to system in the house) – means you will have been deemed to have complied with the Regs.

4.2.1.3 MCS

We couldn't find anything within MCS that clearly mandates a requirement for fire detection, but as with the other docs the pointers are there. An example is contained in a paragraph on Building Regulations (2.4.3) which states:

"*All installation work in or around occupied structures will be covered by the building regulations. Different sets of regulations apply depending on the geographical area within the UK.*

Whilst all of the regulations are set out and worded slightly differently, they all have the same aims and objectives of ensuring that the buildings that they cover are built and maintained in safe, reliable and most energy efficient way. ***It should be noted that by adding additional equipment to an electrical installation, it may be necessary to provide appropriate fire detection measures.***"