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AEFM Whitepaper

Navigating the Lithium-Ion Crisis: Risk Management for the UK Built Environment

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Facilities Management

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Contents

Executive Summary

As the United Kingdom accelerates towards its Net Zero targets, the proliferation of lithium-ion (Li-ion) batteries from personal e-mobility devices to industrial Uninterruptible Power Supplies (UPS) has introduced a volatile fire risk to the built environment. In 2024, UK fire services faced a 93% increase in lithium-ion battery fires compared to 2022. For Facilities Management (FM) professionals, these incidents represent a critical threat to life safety, structural integrity, and business continuity.

This whitepaper, produced by AEFM Limited, evaluates the current risk landscape and provides a strategic framework for FMs to safeguard properties and people against the "epidemic" of battery-related fires.

Andy Erskine
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The Mechanics of Risk: Thermal Runaway

The fundamental hazard associated with Li-ion batteries is Thermal Runaway. This occurs when an internal failure—often caused by physical damage, overcharging, or manufacturing defects—generates heat faster than it can be dissipated.

- **Chain Reaction:** The heat triggers the decomposition of the internal electrolyte, releasing oxygen and flammable gases (such as hydrogen and carbon monoxide).
- **The "Torch" Effect:** Unlike conventional fires, battery fires produce high-intensity, "jet-like" flames and can lead to vapour cloud explosions if gases are confined.
- **Toxic Vapours:** Combustion releases highly corrosive and toxic substances, including **Hydrogen Fluoride (HF)**, which presents a severe inhalation risk to occupants and firefighters.

National Frequency & Impact Analysis

A. National Trends

According to research by QBE Insurance, UK fire brigades now attend an average of three lithium-ion battery fires every day. E-bikes are a primary driver, accounting for roughly 27% of these incidents in 2024.

B. Impacts on the Built Environment

The following data reflects the multi-dimensional impact of battery fires on UK infrastructure and public health.

Impact Category	Key Metric / Finding	Primary Data Source
National Frequency	**1,330** incidents in 2024 (93% increase since 2022)	QBE Insurance / FOI Data
Public Health	**8 fatalities** and **86 casualties** in 2024	Office for Product Safety & Standards (OPSS)
Business Disruption	**54%** of UK businesses have encountered a Li-ion battery issue	Aviva Workplace Survey (2025)
Insurance Claims	Average claim: **£50,000**; severe industrial claims can exceed **£5m**	Allianz UK / Insurance Times
Waste Sector Impact	**1,200+** fires in refuse vehicles/facilities (2023/24)	Environmental Services Association (ESA)
Financial Burden	Estimated **£1 billion** annual cost to the UK economy	ESA / CIEH (2025)

Recent Incidents and Case Studies

Case 1: The "Bromley" E-Bike Fire (September 2025)

A fire in a mid-terraced house in Bromley was caused by the failure of a battery for a **converted e-bike** left on charge. The resulting blaze was so intense that firefighters had to target flames through an open window to prevent the total loss of the structure. Two individuals were hospitalised.

- **Reference:** London Fire Brigade Incident Report

Case 2: Industrial Waste Ignition (Normanton, September 2025)

A fire broke out at the WasteCare WEEE treatment facility in Normanton. The source was identified as a lithium battery hidden within a discarded electrical appliance. This highlights the "zombie battery" risk where improperly disposed items ignite under the mechanical stress of waste processing.

- **Reference:** WasteCare Facility Safety Warning

Case 3: Commercial Premises Loss

Allianz reported on a fire at a motor trade premise caused by a faulty EV battery awaiting collection. The resulting claim reached £5 million, illustrating the catastrophic financial exposure for businesses that do not have dedicated battery quarantine protocols.

- **Reference:** Fire Protection Association Report

Strategic Recommendations for Facilities Managers

To manage these risks, AEFM Limited recommends that FM teams implement a four-pillar strategy integrated into their building management systems.

I. Infrastructure & Compartmentation

- **Places of Special Fire Hazard:** Following BS 9991:2024, charging areas should be treated as high-risk zones. Ideally, e-mobility charging should be moved to external, ventilated, fire-rated enclosures located at least 10 metres from the main structure.
- **Fire Separation:** Internal battery rooms (e.g., UPS or tool charging) must have a minimum of 30 to 60 minutes of fire resistance, with smoke-tight seals and independent extraction to prevent toxic gas migration.

II. Advanced Detection & Suppression

- **Early-Warning Sensors:** Standard ionisation or optical smoke detectors may trigger too late. FMs should install Aspirating Smoke Detection (ASD) or Carbon Monoxide (CO) sensors to detect battery "off-gassing" before open flames appear.
- **Containment Solutions:** Maintain specialised lithium-ion fire blankets in high-traffic areas like mailrooms or loading bays to contain a device fire and prevent horizontal spread.

III. Operational Governance

- **Standardised Policies:** Implement and enforce a strict "No E-Mobility" policy for internal communal corridors and escape routes.

- **Asset Maintenance:** Ensure all building-owned lithium assets undergo regular physical inspections for signs of **swelling, heat discolouration, or leakage** as part of a robust PAT (Portable Appliance Testing) programme.
- **State of Charge (SoC):** For spare or stored batteries, maintain a charge level between **30% and 50%**, which significantly reduces the energy available for a thermal runaway event.

IV. Emergency Planning

- **Specific FRS Notification:** Ensure the site's Fire Emergency Plan includes a mandate to inform the Fire and Rescue Service (FRS) immediately if a lithium-ion battery is involved. Firefighters require this information to adjust their tactics (e.g., using vast quantities of water for cooling).

Conclusion

The rapid adoption of lithium-ion technology has outpaced traditional fire safety legislation. For the UK FM industry, the data is clear: battery fires are a significant and rising liability. By adopting the proactive measures outlined by AEFM Limited, property managers can mitigate the risk of "thermal runaway," protect their structural assets, and ensure the safety of building occupants in an increasingly electrified world.

AEFM Limited: Lithium-Ion Battery Safety Audit Checklist

Category	Checklist Item	Status (Y/N)	Action Required
Governance	Has the building's **Fire Risk Assessment (FRA)** been updated to include Li-ion hazards?		
	Is there a formal policy prohibiting e-mobility charging in **communal corridors** and escape routes?		
	Are tenants/employees issued with a **"Safe Charging"** guide as part of their induction/handbook?		
Infrastructure	Are UPS rooms or battery stores separated by at least **60-minute fire resistance**?		
	Do battery storage/charging rooms have **independent ventilation** to the building's exterior?		
	Are dedicated, fire-rated **charging lockers** provided for power tools or personal devices?		
Maintenance	Are all building-owned lithium assets (e.g., floor scrubbers) on a **physical inspection** log?		
	Do PAT testers specifically check for battery **swelling, leakage, or casing damage**?		
	Is the "State of Charge" (SoC) for stored batteries monitored and kept between **30% and 50%**?		
Detection	Is there **Aspirating Smoke Detection (ASD)** or **CO sensing** in high-density charging areas?		
	Are there specialised **Lithium-Ion Fire Blankets** available at key fire points?		
Emergency	Does the Fire Emergency Plan (FEP) include a protocol to alert the **FRS** to a battery fire?		
	Are staff trained to recognise the signs of **off-gassing** (hissing, "pear-drop" smell, or white vapour)?		

Priority Management Matrix

FMs should categorise findings from the checklist above to prioritise investment:

- **Red (Immediate):** Charging in escape routes, lack of battery-specific fire risk assessment, visible damage to building-owned batteries.
- **Amber (Next 3 Months):** Installation of ASD/CO sensors, formalising e-mobility policies, procurement of containment blankets.
- **Green (Continuous):** Ongoing tenant education, scheduled thermographic surveys of charging hubs.