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Abstract title

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ABSTRACT

The increasing requirement for “fire risk assessments” for Battery Energy Storage Systems (BESS) and other emerging energy technologies reflects a broader regulatory shift toward risk-based decision-making. However, this shift is occurring at such a pace that clearly articulated and understood risk assessment techniques and acceptance criteria are struggling to keep up.

Lessons from the management of combustible cladding in Victoria after the Lacrosse and Grenfell fires show how misalignment of expectations when it comes to risk assessment methodologies and criteria can result in a breakdown of trust between regulators and practitioners. There are lessons that can be applied to BESS risk assessments so that all stakeholders are able to work constructively towards the safe development of renewable energy.

While the National Construction Code (NCC) provides a mature and effective system for managing risks within the built environment, it is fundamentally grounded in historical experience and is therefore limited in its ability to address novel hazards. In parallel, risk-based methodologies derived from ISO 31000 offer a flexible framework for managing uncertainty but rely heavily on clearly defined objectives and acceptance criteria.

This paper examines the tension between these approaches and argues that their conflation, particularly in the context of emerging technologies, can lead to inconsistent outcomes and systemic risk. Drawing on lessons from the cladding crisis, the paper explores how similar conditions are developing for BESS and proposes a more deliberate and structured approach to the selection and application of safety frameworks.

In practice, the absence of clearly defined objectives for “fire risk assessments” has resulted in a wide spectrum of interpretations, ranging from qualitative, experience-based judgments through to highly quantitative analyses that are not always aligned with regulatory intent. This variability is not inherently problematic; however, without a shared understanding of what constitutes an acceptable outcome, it introduces uncertainty into both design and approval processes. This uncertainty can manifest as either overly conservative solutions or, conversely, insufficiently robust controls.

The paper further contends that the issue is not the application of risk-based methodologies per se, but the lack of discipline in their use. Effective risk assessment requires not only technical rigour but also governance structures that define scope, objectives, and acceptance

criteria in a transparent and consistent manner. Without these elements, risk assessments risk becoming exercises in justification rather than tools for decision-making.

By situating BESS within this broader context, the paper highlights the importance of aligning safety frameworks with the nature of the hazard and the objectives of the assessment. In doing so, it aims to support a more coherent and defensible approach to managing emerging risks, avoiding the unintended consequences observed in previous regulatory failures.

KEY WORDS

Battery energy storage systems, new technology, risk assessment, fire safety

BIOGRAPHY

Ben Smith is Arup's APAC Risk & Process Safety Lead and a Chartered Chemical Engineer, specialising in applying process safety to the built environment and advising the process industry. He has led dangerous goods storage and handling strategies across healthcare, education and technology projects, and delivered fire safety studies and quantitative risk assessments for green energy developments.

Laura leads Arup's Victorian Fire Safety Engineering team. Drawing on international experience, she delivers practical, buildable fire safety solutions for complex projects across infrastructure, high-rise commercial, retail and healthcare, guiding projects from concept through completion and into operation.

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