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**Innovation and resilience for the  
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The transition to renewable energy is at once an enormous challenge and an enormous opportunity.

The challenges are in some ways as obvious and conspicuous as a looming thunderstorm: Renewable energy projects like solar and wind farms are vulnerable to hail, lightning and wind. Against this backdrop, the nascent renewables industry is still working to develop reliable engineering standards, all while addressing emerging technology risks.

In other ways, the challenges are as complicated as the global financial system itself: how to find the right insurance cover for the right project at the right time. These challenges – physical, on one hand, and macro, on the other – are at their root intertwined. Take solar panels, for instance. They are vulnerable to hailstorms. As big hail losses have occurred, insurers have cut back on limits for hail, while financiers and developers are asking for higher limits.

Even with these headwinds, the appetite for renewable energy growth is strong. According to a survey commissioned by FM, the vast majority of solar power generators and onshore wind operators plan to grow in the next three years. And nearly three in four financiers surveyed are planning on increasing their investment in renewable energy infrastructure projects.

The key to backing those ambitions, and doing so resiliently, is to consider the risks early. On a solar farm, for instance, once the location and equipment have been chosen, most of a project's risk is already baked in, said Doug Patterson, senior vice-president, forest products and FM Renewable Energy.

"We want to encourage greater consideration of the resilience of a

## Smarter risk insight

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**Pamela Griffing, staff senior vice-president and chief tax officer, FM**



**Doug Patterson, senior vice-president, forest products and FM Renewable Energy**

facility when commercial decisions are made," Patterson said. "I don't think the balance is right at the moment, but that's because providers and financiers don't yet have the risk insight to make truly informed decisions."

### European expansion

The momentum of the market can be seen in FM's own recent decision to expand our FM Renewable Energy unit to Europe in 2025.

The move came a year after the successful launch of FM

Renewable Energy in North America.

In addition to insuring renewable energy, FM also invests in renewable energy itself. When making decisions, FM digs into the details, said Pamela Griffing, staff senior vice-president and chief tax officer. Griffing is responsible for identifying renewable energy infrastructure projects for investing.

"We are looking for something that is well constructed, designed by experienced developers, and we want to know who the insurance company is," Griffing said.

Financiers surveyed by FM echoed that focus on resilience: Nearly three quarters said resilience has a moderate or significant impact on the deal terms they offer, with 69 per cent saying it affects their valuation of a project, and 66 per cent saying it affects the likelihood they will invest.

### New risks, new approaches

While the transition to renewable energy presents significant challenges, both in terms of physical risks and financial complexities, the industry remains committed to growth and innovation, with the potential for substantial advancements if early risk considerations and resilient planning are prioritised. New technologies do bring new risks, which call for new approaches to prevent them.

**What's next for renewable energy? Read the report**





In a rapidly changing world, the need for research and innovation has never been greater. Artificial intelligence and technology will revolutionise industries across the globe. Understanding business risks associated with the future of industry, including AI, machine learning, automation, and data is more important than ever. Coupled with increased climate-related risks, businesses are increasingly vulnerable to unexpected interruptions.

FM's forthcoming state-of-the-art science and technology centre in Luxembourg stands at the forefront of those intertwined developments. In March, we celebrated the groundbreaking of the FM Science and Technology Centre, Europe. This 25,500<sup>m</sup><sup>2</sup> (260,000<sup>ft</sup><sup>2</sup>) facility in Luxembourg, our European home since 2017, will enhance our ability to address the unique challenges and opportunities in the region and around the globe. It is just the latest chapter in FM's loss-prevention story.

FM was founded in 1835 on the fundamental belief that loss is preventable through innovation, research and engineering. Risk transfer, whether in a 19th century textile mill or a 21st century technology-driven facility, is not enough. The context may change, but research and engineering have always been core to our philosophy, whether through our insurance offerings or our third-party testing and certification capabilities, FM Approvals. In the 1830s, it meant mills constructed with heavy fire doors and slate shingle roofs. In the 1880s, FM Approvals experimented with fire protection hydraulics, which ultimately led to FM Approvals fires testing in a shed in the middle of an apple farm in Woburn, Massachusetts, US in the early 1900s.

We have come a long way since then. Today we have science and

# Confronting the resilience challenge

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technology research facilities in West Gloucester, Rhode Island, US; Norwood, Massachusetts, US; and Singapore. These centres are connected by a large-scale digital immersive 'co-laboratory' environment, allowing clients, stakeholders, and FM staff to interact with research and testing performed at any site. They each have their areas of focus, but the common thread is helping see things others don't.

When the Luxembourg facility is completed in 2027, areas of study will include climate, automation and cyber risks, all of which are in sharp focus.

On climate, 2024 was the hottest year on record both globally and in Europe. According to the most recent European State of the Climate report, Europe is the world's fastest-warming continent. Many impacts were already evident in 2024: the most widespread flooding since 2013, the highest number of days on record with high levels of heat stress, and the lowest number of days on record with strong cold stress. There was good news, too: The report found a record proportion of electricity generation by renewables in Europe in 2024, at 45 per cent.

On automation and cyber, more business and industrial processes are becoming digitised and automated. This will bring new efficiencies to global businesses, but also new risks to consider. Fully automated

warehouses, for instance, aren't just a cyber security challenge. They also pose different fire risks, the sort not easily put to the test on an apple farm. New and innovative storage materials require new and innovative sprinkler protection and fire detection. AI, meanwhile, will empower not just cyber attackers but defenders, too.

The FM Science and Technology Centre, Europe will bring FM's unique approach to identifying science-based solutions for these sorts of risks even closer to our clients. We recognise the region's strong talent base in climate sciences, and have established partnerships with European leaders in automation, digital technology, and cyber sciences.

In this ever-evolving landscape, FM is at the forefront of integrating innovation with risk mitigation. Businesses must understand both their exposures, and the steps to best address them. Research and science will be pivotal in that understanding.

## Manage risk with FM's engineering approach



**Christopher Dempsey**  
senior vice-president,  
EMEA division manager,  
FM



# The lithium-ion safety challenge

Every day, we rely on rechargeable, lithium-ion batteries to power everything from small devices to electric vehicles. These batteries offer a high power-to-size ratio, but can carry safety considerations that must be studied closely.

Safety risks stemming from manufacturing defects, design flaws, and improper handling of li-ion batteries are multifaceted. The British Safety Council suggests that in the UK alone, li-ion batteries discarded in domestic and business waste are responsible for an estimated 201 fires annually. According to data compiled in August 2024 by Gallagher Bassett, lithium battery packs directly cause nearly 24 per cent of all EV fires alone.

To address increasing risk concerns, FM has developed a comprehensive loss prevention guide for the manufacturing and storage of li-ion batteries. Based on rigorous research at FM's state-of-the-art testing facilities, the guide provides much-needed clarity on evolving li-ion risks.

"People are familiar with the risks portrayed in the news, such as batteries catching fire or exploding, but they don't realise how often these incidents actually occur. Many of these incidents stem from specific factors, not the batteries in general," says Stephanie Thomas, senior staff engineering specialist at FM. "There's a misconception about the frequency of these hazards, and insufficient information on how to handle them safely."

Our guide aims to provide practical advice, helping businesses protect against fires, explosions and other hazards arising from li-ion battery

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storage and use. By performing tests that involve setting pallet-loads of batteries on fire, and smaller-scale experiments to understand the fundamental physics of battery fires, FM researchers identified key risk factors and strategies for prevention. The data sheet consolidates this research to offer actionable insights.

One of the primary hazards associated with li-ion batteries is thermal runaway, which occurs when a battery experiences a short circuit, causing a chemical reaction that releases flammable gases. These gases can quickly escalate into a fire or explosion, and once the process begins, it is often uncontrollable. Our guide offers strategies to prevent thermal runaway from affecting multiple cells, such as isolating affected batteries or applying water to cool the system.

As Benjamin Ditch, principal research engineer at FM, explains, "It's not that you can't protect against these risks. The key is understanding them correctly."

Notably, many of the incidents related to li-ion batteries are caused by mishandling of the batteries – including dropping, overcharging or puncturing. "The vast majority of li-ion batteries, like those in smartphones or laptops, rarely experience problems. The batteries that do malfunction have usually been abused in some way," Thomas emphasises.

Our data sheet offers specific recommendations on how to store li-ion batteries safely. It provides guidance based on the state of charge of the batteries, their packaging, and the type of products being stored. For example, if batteries are stored in their packaging (such as in power tools), the risk of a thermal runaway event is lower because the batteries are less likely to propagate the thermal runaway to adjacent batteries, given all the additional packaging materials. Moreover, sprinklers could help manage any fire incident that might occur.

Storing batteries in bulk, or without packaging, also increases the risks. Our guide stresses the importance of installing robust fire protection systems, such as in-rack sprinklers, to limit fire spread. "The more batteries that are exposed, the greater the risk of escalation," Ditch says.

FM's approach to li-ion battery safety is collaborative. The data sheet guidance was developed taking into account extensive input from li-ion battery manufacturers, safety experts and sprinkler manufacturers. This collaborative effort ensures that businesses are not just following generic safety protocols but are also applying practices tailored to the unique risks of li-ion batteries.

**Cut property loss in li-ion battery sites. Get the FM data sheet**



While largely out of sight and mind, datacentres now serve as a critical foundation for modern society. From national security, public services and banking to media, manufacturing and retail, all organisations depend on reliable and resilient infrastructure. Meanwhile, rapid advances in artificial intelligence are fuelling demand for AI-ready datacentres.

AI and other compute-intensive activities are stoking a rapid increase in datacentre development. According to ResearchAndMarkets.com, datacentre construction in North America will grow at a compound annual growth rate of 8.1% through 2030. At the same time, evolving technology and accompanying infrastructure will require an increasing amount of power generation. This extraordinary pace comes with challenges, and a growing exposure to site and design risks. Whether developing new builds or upgrading existing facilities, identifying and eliminating vulnerabilities that could lead to disruption or catastrophic loss are key.

FM helps datacentre clients navigate the dual challenge of growth and risk. Our roots are in engineering and science, and we've grown alongside every major wave of digital transformation – from semiconductors to software, and now AI. As a mutual insurer built by engineers, we bring a shared understanding of the pressures and technologies that define the sector.

With demand rising, datacentres are increasingly constrained by access to power and cooling. Power alone now accounts for approximately three per cent of global energy use, and continues to rise. Ensuring reliable access to both power and water is becoming a critical barrier to development. These needs also introduce new risks,

# Powering the future

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from unsuitable building materials to under-engineered cooling systems and single points of failure.

Our engineering-led approach assesses flood risk and propose mitigation strategies – from grading and drainage to barriers and elevated infrastructure. We also guide the placement of back-up systems, ensuring they are positioned safely away from core operations.

Our advice includes specifying appropriate protection systems and using FM Approved products that have been rigorously tested for reliability and performance in high-risk environments.

FM has a deep expertise in the cooling systems that underpin datacentre performance, from conventional CRAC units to newer technologies including liquid cooling, immersion systems and rear-door heat exchange. We assess all aspects of these systems, from continuous cooling capacity to back-up provision and real-world risks such as prolonged heatwaves. We also evaluate how systems are maintained and operated, ensuring people, processes and technology work together to prevent downtime.

At FM's Research Campus, we maintain four advanced laboratories focused on fire, natural hazards, hydraulics and electrical systems. For datacentres, this includes testing lithium-ion UPS systems, off-gassing detection equipment, and the

performance of hot and cold aisle containment materials.

This quarter also sees the launch of our FM Intellium programme. Designed to address the complexities of datacentres, AI, and the power generation required to fuel these new technologies, Intellium represents FM's commitment to innovation in these fast-expanding sectors. FM has been insuring datacentres for more than 25 years. Today the company provides servicing to approximately 1,100 datacentres, representing US\$250 billion of insurable value.

## 🔍 Tackling datacentre risks – insights from FM's experts

The rapid growth of the datacentre sector brings heightened risk, from extreme weather and cyber threats to the operational demands of AI. In our recent webinar, senior technical engineering specialist Adrian Oxley, and high-hazard occupancy specialist Paul Heisel explored these issues in depth.

"Downtime costs can reach up to nine thousand dollars per minute," Oxley says. "Prevention isn't optional – it's essential."

Heisel pointed to the Texas Freeze of 2021 as a moment that proved the value of readiness: "Our clients stayed online throughout that crisis because the right protections were already in place," he notes. The session explored practical steps to build resilience and mitigate business interruption.

**Datacentre challenges? See FM's solutions and expert webinar**







Others see water damage.

We see  
a way forward

Together, we can strategically  
protect against a changing climate.

See what others don't. Protect in ways others can't.  
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