



Insurance Council
of Australia



Briefing note: Managing fire risk from electrified transport in residential buildings

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The Insurance Council of Australia thanks EV Fire Safe and the Electric Vehicle Council for their expert review which assisted in the development of this briefing note as well as ICA members.

Acknowledgement of Country

The Insurance Council of Australia acknowledges the Traditional Owners of country throughout Australia and their continuing connection to land, culture, sea and community. We recognise the tens of thousands of years of continuous custodianship and placemaking by First Nations peoples and their proud role in our shared future. This report was produced on the lands of the Gadigal people of the Eora Nation. We pay our respects to Elders past, present and emerging.

Managing fire risk from electrified transport in residential buildings

Snapshot

Rechargeable lithium-ion batteries are contained in common household items, such as mobile phones, power tools and personal mobility devices such as e-scooters and e-bikes, and also electric vehicles such as cars, buses and trucks.

If severely damaged, abused or faulty, lithium-ion batteries may go into 'thermal runaway', a heat-generating unstable chemical process that can lead to three main hazards: off-gassing, fire and gas explosion.

All hazards of thermal runaway pose serious life and property safety risks when they occur.¹ Whilst incidents are currently rare, a recent report by the ACCC finds that they appear to be increasing.²

There are three distinct types of electrified transport that use lithium-ion batteries for propulsion and require connection to power to recharge the battery pack. These are:

Personal Mobility Devices (PMDs), including electric bikes, scooters, skateboards, hoverboards and unicycles.

According to EV FireSafe data, personal mobility devices have a higher risk of battery fire overall and a higher risk of causing injury, fatality and property loss. This is primarily due to market demand leading to poor design and manufacturing, high wear and tear, poor regulation and enforcement, and the storage and charging of personal mobility devices inside buildings.

EV FireSafe's data shows that for personal mobility devices, there is at least one battery fire incident every day in New York and London, and they are occurring weekly in Australia. There is at least one verified death from a personal mobility device battery fire in Australia and multiple serious injuries.

Light Delivery Electric Vehicles (LDEVs), including electric golf buggies, carts and tuk-tuks.

Data is emerging to suggest light delivery electric vehicles are a moderate fire risk. This is primarily due to market demand leading to poorly constructed battery cells.

EV FireSafe's data indicates that for light delivery electric vehicles there have been at least 35 battery fires in Europe, one verified in Australia and one currently being investigated.

Road Registered Electric Vehicles (EVs), including electric cars, buses, trucks and motorbikes.

According to EV FireSafe data, electric vehicles have a very low risk of battery fire. Electric vehicles are subject to stringent regulations and testing, and use very high quality battery cells encased in a protective (IP rated) battery pack.

EV FireSafe has found that for electric vehicles there have been 6 battery fires in Australia, with one fatality (still under investigation). None of these vehicles were charging, or connected to

¹ ACCC (2023), Consumers urged to use and store lithium-ion batteries safely to prevent deadly fires

² ACCC (2023), Consumers urged to use and store lithium-ion batteries safely to prevent deadly fires

charging equipment, at the time of the fire. Research indicates that road registered electric vehicles do not present a greater risk of fire occurrence than internal combustion engine (ICE) vehicles³ and one study has found that they catch fire at about one-twentieth of the frequency of ICE vehicles.⁴ However, when electric vehicle battery fires do occur, they need to be managed differently, and may require more time, resources and firefighting water to manage the incident.






Minimising potential fire risks

As shown in the figure below,⁵ different categories of electrified transport have different fire risk profiles, with personal mobility devices having the highest risk.

Lithium-ion batteries; fire risk profiles based on EV FireSafe global research & data



Categories of lithium-ion battery uses for emergency response, including emergency response guide (ERG) availability, fire risk profile & high level response tactic.

| Category | Smaller Devices | Personal Mobility Devices (PMD) | Light Delivery EV (LDEV, non-registered) | Road registered EV (EVs) | Battery energy storage systems (BESS) |
|--|--|--|---|--|---------------------------------------|
|  |  |  |  |  | |
| OEM guidance | No ERG | No ERG | No ERG | Most ERGs available | Most ERGs available |
| Risk | Low risk | High risk | Moderate risk | Very low risk | Very low risk |
| Response | Submerge | Submerge | Cool Burn | Cool Burn Submerge | Burn |

evfiresafe.com

The fire risk associated with lithium-ion batteries in all vehicle types, can be minimised by:

- Improving public understanding of the risks and hazards, including highlighting the situations where potential fire risk is increased, such as where vehicles have been damaged in an accident.
- The correct purchase, operation and maintenance of vehicles and charging cables and units.

³ Boehmer HR, Klassen MS and Olenick SM (2021) Fire Hazard Analysis of Modern Vehicles in Parking Facilities, Fire Technology, No 5; Burke G (2021) EV Risk Assessment. Risk Impact Pty Ltd; Bisschop R, Willstrand O and Rosengren M (2020) Handling Lithium-Ion Batteries in Electric Vehicles: Preventing and Recovering from Hazardous Events, Fire Technology, 56, 2671–2694; Sun P, Huang X, Bisschop R and Niu H (2020) A Review of Battery Fires in Electric Vehicles, Fire Technology, 56, 1361–1410.

⁴ MSB (2023) Fires in electric means of transport in 2022; as cited in The Driven (2023) Petrol and diesel cars 20 times more likely to catch fire than EVs.

⁵ Figure 1. Different categories of electrified transport have different fire risk profiles, with personal mobility devices having the highest risk. Courtesy EV FireSafe.

Key principles

The Insurance Council and its members have developed the following principles for users of personal mobility devices such as e-bikes and e-scooters, which align with recent recommendations from the ACCC.⁶ Users should:

- Choose a reputable brand from a 'bricks and mortar' supplier and buy the best they can afford
- Ensure there is sufficient air flow around lithium-ion batteries when charging.
- Store batteries and lithium-ion products in cool, dry places and out of direct sunlight, including while charging.
- Avoid using batteries, products or chargers that are damaged, overheating or showing signs of failure such as swelling, leaking or venting gas.
- Check the charger being used is suitable for the product being charged.
- In the event of a fire, contact 000 immediately.

Next steps

To help support the uptake of personal mobility devices, such as e-bikes and e-scooters, the Insurance Council intends to:

- Engage with relevant fire authorities in supporting testing and building a better understanding of emerging risks, particularly in relation to personal mobility devices.
- Engage with the relevant strata groups and associations to support the development of guidance or by-laws to assist in consistent risk management across strata buildings.
- Work in collaboration with key bodies across industries and governments to support the acceleration of Australia's electric vehicle transition, whilst appropriately managing emerging risks.

⁶ ACCC (2023) Consumers urged to use and store lithium-ion batteries safely to prevent deadly fires



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About the Insurance Council of Australia

The Insurance Council of Australia is the representative body for the general insurance industry of Australia. Our members represent approximately 90 per cent of total premium income written by private sector general insurers, spanning both insurers and reinsurers. Our work with our members, consumer groups and all levels of government serves to support consumers and communities when they need it most.

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