energysafe VICTORIA

Electrical safety requirements for lithium-ion battery powered e-transport devices

Consultation paper, August 2025

VICTORIA State Government

Contents

Summary

Lithium-ion battery powered e-transport devices – such as e-bikes, e-scooters, e-skateboards and self-balancing scooters – are increasingly popular in Victoria. While they offer a convenient, low-emissions transport option, incidents in Australia and overseas have led to increasing concerns about the safety of these devices and particularly their lithium-ion batteries. Electrical fires caused by lithium-ion batteries can start without warning and be difficult to extinguish, the consequences of which can be severe.

E-transport devices and their lithium-ion batteries must comply with electrical safety standards and be safe to be connected to an electricity supply to be supplied in Victoria. However, there is currently no requirement for independent pre-market testing or verification to ensure this is the case. This leads to a greater risk of poorly made devices being supplied in Victoria.

This risk could be addressed by making these devices "controlled electrical equipment" under section 55 of the *Electricity Safety Act 1998* (Vic) (**Act**). Controlled electrical equipment must be certified to electrical safety standards and marked accordingly before it can be supplied in Victoria. We are seeking your feedback on this proposal.

This consultation paper:

- outlines the nature of the safety risks and relevant incident data
- summarises existing regulatory requirements in Victoria and other jurisdictions
- discusses the proposal to make e-transport devices and their lithium-ion batteries "controlled electrical equipment" under the Act
- discusses the relevant safety standards that would apply for certification and the phasing-in of any new requirements.

We want to hear from manufacturers, suppliers, retailers, transport and safety experts, local government, community organisations, and members of the public. Your insights will help us assess the scale of the risks, the potential solutions, and the likely impacts on users and industry.

Submissions are open until **Monday 13 October 2025 at 12pm**. After considering all submissions, we will publish a summary of feedback and outline any next steps.

How to provide feedback

You are invited to provide written submissions to our consultation. This document includes specific questions for feedback – you can respond to as many or as few questions as you wish.

Submissions can be emailed to consultation@energysafe.vic.gov.au or posted to:

Consultations
Energy Safe Victoria
PO Box 262
Collins Street West, Victoria 8007

Alternatively, you can complete our online survey available on our website www.energysafe.vic.gov.au/consultations.

All submissions will be treated as public and may be published on our website unless the submitter requests confidentiality. Any information that is commercially sensitive or confidential should be clearly marked. Names and other personal information will be removed from submissions prior to publication.

If you have any questions, please contact us at consultation@energysafe.vic.gov.au.

1 Current state

This section considers electrical safety incidents associated with e-transport devices, the relevant energy safety framework for regulating this type of electrical equipment in Victoria, and regulatory changes underway in other jurisdictions.

1.1 Increasing electrical safety incidents associated with e-transport devices

E-transport devices powered by rechargeable lithium-ion batteries are increasingly popular in Victoria. An estimated 13% of Victorians (about 900,000 people) currently own an e-bike, e-scooter or e-skateboard, and an estimated 19% are considering purchasing one in the next 12 months.[1] Fun and fitness have been identified as key drivers for purchasing e-transport devices, alongside contribution to lower emission lifestyles and convenience and affordability over other transport options.[2]

While e-transport devices and lithium-ion batteries offer significant benefits they also present electrical safety risks. The most serious of these is the risk of battery fire, typically caused by a "thermal runaway" event. This occurs when a battery overheats, triggering a chemical reaction that generates even more heat – leading to a severe, self-sustaining fire that is extremely difficult to extinguish.

Thermal runaway can happen due to physical damage to the battery (for example, from dropping or vibration), overcharging, using non-compliant or incompatible chargers, modifying or tampering with the battery system, and improper storage. It can occur at any time and sometimes without warning. The risk is elevated when devices are not designed to withstand such conditions.

Fire Rescue Victoria reports attending almost one lithium-ion battery fire a day, with most of those anecdotally attributed to e-transport devices.[3] The consequences of these battery fires can be significant. They have caused at least two fatalities in Australia, as well as severe injuries, property damage and public disruption.[4] [5]

In Victoria for example:

- two people were hospitalised for injuries after evacuating from a first-floor window to escape an e-bike fire in Footscray in August 2024.
- passengers had to evacuate train carriages at Union Railway Station when an e-bike onboard caught fire in March 2025.
- an e-scooter in Templestowe caught fire and a resident was injured as they escaped the fire through a second-floor window in April 2025.
- two residents of a South Melbourne apartment suffered smoke inhalation and severe burns after an e-scooter caught fire that was charging on an incompatible charger in May 2025.

Comparable jurisdictions report similar issues. In New South Wales, about 1 in every 40 fires attended by Fire and Rescue New South Wales (**FRNSW**) involves a lithium-ion battery or battery device, and a

[1] Consumer Attitudes towards Rechargeable Batteries Baseline Study, prepared for Energy Safe Victoria by Quantum Market Research, October 2024

[2] The Australian Cycling and e-Scooter Economy in 2022, prepared for We Ride Australia by Ernst & Young, November 2023

[3] https://www.frv.vic.gov.au/energy-safety-regulator-launches-safety-campaign-research-shows-young-people-taking-risks-lithium

[4] https://www.coronerscourt.qld.gov.au/__data/assets/pdf_file/0006/804948/nif-tyson-08042024.pdf

[5] https://www.fire.nsw.gov.au/gallery/resources/SARET/FRNSW%20LiB%20fire%20data%20Jan-Jun%202024.pdf

quarter of those involved e-transport devices, mostly e-bikes.[6] FRNSW also reports that lithium-ion battery fires in the first half of 2024 were more than twice as likely to result in injury compared to the average for all fire and explosion events.[7]

1.2 Legislative framework

Purpose of the Act and Energy Safe's functions

In Australia, personal and household electrical product safety is regulated by states and territories. In Victoria, it is under Part 4 of the *Electricity Safety Act 1998* (Vic) (**Act**). The purpose of the Act includes making provisions relating to:

- the safety of electricity supply and use, and
- the efficiency of electrical equipment.[8]

The functions of Energy Safe Victoria under the Act include (but are not limited to):

- to determine minimum safety standards for electrical equipment, electrical installations and electrical work
- to inspect and test electrical equipment, in-scope electrical equipment or electrical installations and electrical work for compliance with the standards prescribed or relevant standards
- to investigate events or incidents which have implications for electricity safety, and
- to monitor and enforce compliance with the Act and the regulations.[9]

The relevant regulations are the Electricity Safety (Equipment Safety Scheme) Regulations 2019 (Vic) (**Regulations**).

Regulatory requirements for all electrical equipment sold in Victoria

The Act and Regulations give effect to the Electrical Equipment Safety Scheme, a regime that several states and territories have adopted or recognise to harmonise electrical safety regulation in Australia.

Under this framework, low voltage personal and household appliances are "in-scope electrical equipment" and subject to pre-market requirements depending on the risk level of the equipment. Requirements include certification against prescribed safety standards, registration on a public database, and marking/labelling of the equipment.

The Act and Regulations also regulate electrical equipment that is "not in-scope" equipment, which may operate at extra low voltage (**ELV**). The equipment must be electrically safe and comply with the standard *AS/NZS 3820:2009 Essential safety requirements for electrical equipment* (**AS/NZS 3820**).

Energy Safe has powers under sections 63 and 65 of the Act to recall or prohibit the supply of unsafe electrical equipment in Victoria. Commonwealth and state Consumer Affairs Ministers also have powers to recall or ban products under the *Australian Consumer Law*.

Current regulatory requirements for e-transport devices and associated lithium-ion batteries sold in Victoria

For e-transport devices, the electricity safety-related regulatory requirements in Victoria mean that:

- The power supply (charger), which operates at low voltage and is rated as "Level 3 in-scope electrical equipment", must be registered on the national register, independently certified to the relevant standard, and marked with the Regulatory Compliance Mark (**RCM**) shown below

[6] https://www.fire.nsw.gov.au/gallery/resources/SARET/FRNSW%20LiB%20fire%20data%20Jan-Jun%202024.pdf

[7] Ibid

[8] Section 1 of the Act

[9] Section 7 of the Act

- The other electrical components of the device, including the lithium-ion battery, operate at ELV and are “not in-scope” equipment, so must comply with AS/NZS 3820. This equipment does not have to be certified, registered, or marked with the RCM.

A key challenge is that the absence of pre-market checks means there is a greater risk of poorly manufactured or unsafe devices entering the market. Additionally, the lack of marking or registration requirements make it difficult for retailers, consumers, and regulators to verify whether a device meets safety standards. Together, these gaps increase the risk of unsafe products being sold and used without clear means of identification or assurance of compliance.

1.3 State and national initiatives related to e-transport device electrical safety

The emerging electricity-related risks presented by lithium-ion battery powered e-transport devices are not unique to Victoria, with initiatives underway in other states and at the national level. The following are some of the initiatives that are focused on legislative and regulatory change.

Victoria and NSW

In Victoria, the Government recently consulted on:

- Proposed changes to public transport rules, including prohibiting or limiting the carriage of e-transport devices on public transport such as trains, buses, and trams, due to battery fire risk[10]
- Reform options being considered as part of the Energy Safety Review, which include improving Energy Safe’s powers with regards to standards and product labelling and advocating for a national approach to consumer education and electrical safety standards for lithium-ion batteries.[11]

NSW Fair Trading has introduced new regulatory requirements for e-transport devices, which will be phased in during 2025 and 2026:

- Product safety standards – retailers and manufacturers can only sell e-transport devices and associated lithium-ion batteries in NSW if they are certified as complying with prescribed safety standards. The prescribed safety standards are specific to each type of device. The certification number must also be marked on the product. This will be enforced from 1 February 2026.
- Information standard – retailers and traders of e-transport devices in NSW must provide customers with essential product safety information at the point of sale or supply. This includes details for safe use, charging, storage, fire prevention, and recycling. The information standard commenced on 19 February 2025.[12]

In August 2025, the NSW government announced public consultation on a proposal to temporarily ban e-bikes, e-scooters and other e-transport devices on trains and metro services due to increased concerns about the fire safety risk from lithium-ion batteries.[13]

Victorian and NSW Transport Ministers also jointly wrote to the Commonwealth Assistant Treasurer, Hon Dr Daniel Mulino MP, seeking national action on the safety of personal mobility devices. The

[10] https://engage.vic.gov.au/public-transport-regulations

[11] https://engage.vic.gov.au/energy-safety-review

[12] https://www.nsw.gov.au/housing-and-construction/safety-home/electrical-safety/lithium-ion-battery-safety/new-standards-for-lithium-ion-batteries-e-micromobility-devices

[13] https://www.haveyoursay.nsw.gov.au/changes-using-e-micromobility-public-transport

letter calls for a new product safety standard under the *Australian Consumer Law* to address speed capability and battery safety.[14]

National initiatives

At the national level for example, Consumer Affairs Ministers have agreed to cooperate to harmonise the regulation of household electrical consumer products, including establishing a regular meeting of Ministers who will "oversee and monitor implementation of agreed reforms including investigating risk-based regulation of ELV electrical products, such as certain lithium-ion batteries".[15]

[14] https://www.smh.com.au/interactive/hub/media/tearout-excerpt/46995/Letter-to-the-Hon-Dr-Daniel-Mulino-MP---E-micromobility-devices.pdf

[15] https://ministers.treasury.gov.au/ministers/stephen-jones-2022/media-releases/consumer-affairs-ministers-renew-commitment-protecting

2 Discussion

Our policy objective is to reduce electricity safety risks associated with lithium-ion battery powered e-transport devices by ensuring the regulatory framework that applies to these devices is fit-for-purpose.

2.1 Energy Safe's current regulatory activities

Energy Safe is actively addressing safety risks associated with lithium-ion battery powered e-transport devices. For example, we have recently delivered a campaign with support from Fire Rescue Victoria about the importance of charging e-scooters with compatible chargers.[16] We have also been carrying out compliance and enforcement activities, including supplier audits and issuing infringement notices when non-compliance is found.

However, we consider that these approaches are not providing strong enough safeguards to ensure unsafe e-transport devices are kept out of the Victorian market. While these measures have some impact, they are not sufficient to address ongoing safety risks.

2.2 Declaring e-transport devices to be controlled electrical equipment

Energy Safe has a power under section 55 of the Act to "declare that an item, description, type or component of electrical equipment, that is not in-scope electrical equipment is controlled electrical equipment". Controlled electrical equipment cannot be supplied in Victoria unless it has a certificate of conformity demonstrating compliance with AS/NZS 3820 and has been marked accordingly.

These pre-market controls are like those for level 3 in-scope electrical equipment, but without the supplier registration requirement, and with a certificate-number marking instead of the RCM tick. Despite the difference, a declaration would allow regulators, retailers, and consumers to verify compliance quickly, avoiding the current burden of document checks or technical testing to confirm non-compliance.

While other regulatory tools such as guidance, penalties, and recalls remain important, they cannot provide assurance before products reach consumers. Pre-market certification and marking directly addresses this gap, supporting our strategic goal that by 2028 only equipment that is safe by design and for use is supplied in Victoria.

We recognise that new certification and marking requirements would have cost and operational implications for suppliers and manufacturers. This consultation seeks feedback on those impacts to ensure the proposed approach is a proportionate response to the safety risks. We would also continue non-regulatory measures, including public education on safe charging and using compatible equipment, to address risks arising from consumer use.

Questions for consultation
1. **Do you agree with our proposal to declare e-transport devices and associated lithium-ion batteries as "controlled electrical equipment" under the Act? Why or why not?**
2. **Are there alternative approaches you believe would effectively manage the electrical safety risks associated with lithium-ion battery powered e-transport devices?**

[16] https://www.energysafe.vic.gov.au/before-you-know-it

3. If you are a user or potential user of e-transport devices, would knowing the product is independently safety certified impact your purchasing decisions?

Equipment that would be subject to the declaration

Defining "controlled electrical equipment" accurately is important to ensure that the proposed regulatory action achieves the desired objectives and avoids unintended consequences.

If a declaration is progressed, it must impose controls on all e-transport device equipment that presents risks but are not already regulated as "in-scope electrical equipment". We must also avoid inadvertently imposing conditions on other equipment that is not being targeted, such as other devices powered by lithium-ion batteries, electric passenger vehicles, or motorised wheelchairs.

The box below outlines our initial view on equipment definitions for feedback. The definitions will inform a potential declaration notice and any associated policies – they need to be appropriate, transparent, and understandable.

Draft definitions for consultation

The controlled electrical equipment includes:

- **An item that is electrical equipment comprising electric bikes, electric bike conversion kits, electric scooters, electric skateboards, electric mono-wheels, and electric self-balancing scooters that are powered (in part or in whole) by one or more rechargeable batteries**
- **The rechargeable battery, including the battery management and charging system, used to power any devices identified above, that is not otherwise in-scope electrical equipment as defined in the *Electricity Safety Act 1998 (Vic).***

Electric scooters, electric skateboards, electric mono-wheels and electric self-balancing scooters has the same meaning as used in *AS/NZS 60335.2.114:2023 Household and similar electrical appliances - Safety, Part 2.114: Particular requirements for Personal-e-Transporters* or refers to any other electric micromobility device intended for a single rider, with or without a seat and without pedals, that balances and propels the rider (and may or may not comprise a handle and may or may not be self-balancing).

Electric bike means a single or multi-wheeled device with functional pedals that includes one or more electric motors to either assist the rider when pedalling or provide motive power to the wheels when the rider is not pedalling.

Electric bike conversion kit means a set of electrical components intended to enable electric propulsion of a bicycle, which may include one or more of the following: electric motor, propulsion battery, motor controller, wiring harness, and controls.

Questions for consultation
4. Do you agree with our draft definition for e-scooters, e-skateboards, and other e-transport devices?
5. Do you agree with our draft definition for e-bikes and e-bike conversion kits?
6. Do you have any other suggestions for defining e-transport devices, including whether we need to clarify exclusions?

2.3 Safety standards

Declaring e-transport devices as controlled electrical equipment means that these devices cannot be supplied in Victoria unless they have a certificate of conformity demonstrating compliance with

AS/NZS 3820 and have been marked accordingly. AS/NZS 3820 is an outcomes-based electrical safety standard, that allows two pathways to demonstrating compliance:

- Compliance with the “relevant standard” – an Australian or joint Australia/New Zealand standard, or, if none exists, an IEC international standard
- A “technical construction file” – documentation specified by AS/NZS 3820 to demonstrate safety through design and construction evidence.

E-scooters, e-skateboards, e-mono wheels, self-balancing skateboards and their batteries

There is a “relevant standard” for e-scooters, e-skateboards, e-monowheels and self-balancing skateboards (sometimes referred to as “hoverboards” or “e-hoverboards”) and associated batteries: *AS/NZS 60335.2.114:2023 Household and similar electrical appliances - Safety, Part 2.114: Particular requirements for Personal-e-Transporters* (**AS/NZS 60335.2.114**). E-bikes are excluded from the scope of this standard.

AS/NZS 60355.2.114 provides robust testing for electrical safety risks that could lead to a battery fire, such as thermal runaway due to overcharging, overheating, physical damage and faults.

AS/NZS 60335.2.114 is also listed as applicable for the NSW regulatory requirements. The other standards listed as applicable in NSW for these devices, for example *EN17128:2020 Personal light electric vehicles* and *UL2272:2024 Standard for Electrical Systems for Personal E-Mobility Devices*, do not meet the criteria under the Victorian framework as they are neither an Australian or joint Australia/New Zealand standard, or an IEC international standard.

Pedal assist e-bikes and their batteries

There is a “relevant standard” for pedal assist e-bikes and associated batteries – *AS 15194:2016 – Cycles – Electrically power assisted cycles* (**AS 15194**). This standard does not cover e-bikes that have a continuous rated motor power exceeding 250 watts and can power without pedal assistance.

We have identified some concerns with AS 15194 as the standard for pedal assist e-bikes. This is because the standard does not prescribe adequate requirements for the batteries, including testing for factors critical for preventing battery fires, including:

- overcharging of the battery
- fault conditions other than shorting of the battery and motor terminals
- water immersion
- temperature rise during normal operation
- vibration resistance and drop impact
- fire spread prevention.

We will therefore need to consider how these shortcomings would be addressed to certify that pedal assist e-bikes are electrically safe to operate.

We note that NSW prescribes the following standards for e-bikes not exceeding a continuous rated power of 500 watts:

- AS 15194
- *EN 15194:2017 +A1:2023 Cycles – Electrically power assisted cycles* (**EN 15194**, the European version of the standard that AS 15194 adopted)
- *UL 2849:2022 Electrical Systems for eBikes* (**UL 2849**).

The NSW declaration modifies the scope of AS 15194 and EN 15194, which only apply to e-bikes with a continuous rated power output of up to *250 watts*, so that it can apply to e-bikes with a continuous rated power of up to *500 watts*.

EN and UL standards cannot be called up under the Victorian legislation as they do not meet the definition of “relevant standard”.

Other e-bikes and batteries

E-bikes that have a motor power exceeding 250 watts and/or can power without pedal assistance are out of scope of AS 15194. There is also no IEC standard for these types of e-bikes, which means that these devices and any associated batteries would need to demonstrate compliance to AS/NZS 3820 through a technical construction file.

NSW requires compliance with UL 2849 for e-bikes exceeding 500 watts. Again, UL 2849 is not a “relevant standard” under AS/NZS 3820 and so does not apply in Victoria.

E-bike conversion kits

We are not aware of a “relevant standard” for e-bike conversion kits. In these cases, compliance would need to be demonstrated through a technical construction file.

NSW does not prescribe requirements for e-bike conversion kits.

Questions for consultation
7. If you are a supplier/manufacturer/importer, what standards are your e-transport devices currently complying with?
8. Do you have any comments on the electrical safety shortcomings of AS 15194? How do you think these shortcomings can be best addressed?
9. What would be the impact of certification to different standards in different jurisdictions of Australia (e.g. different standards in VIC and NSW)?
10. What type of guidance would you need, if any, to clarify how to comply with the technical construction requirements of AS/NZS 3820?
11. What would be the costs and operational impacts to your business of certifying and marking e-transport devices to meet safety standards? Please provide approximate figures or ranges, including any testing, labelling, or administrative costs, and how many product lines you would need to certify.

2.4 Timing and phasing

Industry will need sufficient time to comply with any new certification or marking requirements under a controlled equipment declaration.

As noted, NSW Fair Trading has recently introduced new regulatory requirements for e-transport devices, including certification and marking requirements, with key measures being phased in throughout 2025 and 2026. Given NSW’s actions in this space, implementing comparable requirements in Victoria may be more straightforward.

We are seeking stakeholder views on the appropriate implementation timeline if similar requirements are introduced in Victoria. The timing will need to balance industry’s transition needs with our safety objectives.

Questions for consultation
12. What factors should we consider when assessing the timing of new electrical safety requirements for e-transport devices?
13. If you are a supplier/manufacturer/importer, how much time do you estimate is needed to achieve compliance with new certification and marking requirements for e-transport devices and associated batteries? Please provide as much information and evidence as possible.

3 Next steps

We invite interested parties to provide written submissions on our preliminary views, or on any other matters relevant to the electrical safety of lithium-ion e-transport devices, **by midday Monday 13 October 2025**.

Your input will help us better understand community perspectives, industry experience, and emerging risks, ensuring that any future actions are well-informed and supported.

After this consultation closes, we will:

- carefully review and analyse all submissions
- publish a summary of the feedback we receive, including our response to key issues raised
- decide whether changes to our preferred course of action are needed and develop next steps.

You can provide feedback by emailing consultation@energysafe.vic.gov.au or post to:

Consultations
Energy Safe Victoria
PO Box 262
Collins Street West, Victoria 8007

Please clearly outline your views, provide any supporting evidence or examples, and suggest alternative approaches if you believe they should be considered. We encourage you to respond to the specific consultation questions in this document, but it is not required for making a submission.

Alternatively, you can complete our online survey available on our website at www.energysafe.vic.gov.au/consultations.

All submissions will be treated as public and may be published on our website unless the submitter requests confidentiality. Any information that is commercially sensitive or confidential should be clearly marked. Names and other personal information will be removed from submissions prior to publication.

If you have any questions about this consultation, please email us at consultation@energysafe.vic.gov.au.