

Submission to Energy Safe Victoria: Electrical Safety Requirements for Lithium-ion Battery Powered e-Transport Devices

Prepared by Zipidi: *e-Mobility response and recommendations*

1. Executive Summary

e-Mobility devices are transforming transport across Victoria, reducing emissions, supporting affordable travel, and creating safer and healthier communities. However, the safety of lithium-ion batteries and device integrity are critical issues. eMobility Australia supports Energy Safe Victoria's proposal to declare e-transport devices as controlled electrical equipment under the Electricity Safety Act 1998.

We believe strong pre-market controls, harmonised standards, and digital verification are essential to ensuring safe and sustainable growth.

Key Recommendations

Harmonisation: Align Victoria's approach with NSW to avoid fragmentation and cost burdens. This would also lay the foundation for other States to adopt the aligned approach and lead to National harmonisation.

- **Recognition of international standards:** UL, IEC, and EN standards should be recognised alongside Australian standards to ensure robust safety and avoid additional testing to different standards, sometimes of a lower threshold, at significant costs.
- **Digital verification:** Introduce digital product passports and unique identifiers to make compliance visible, enforceable and efficient across jurisdictions.
- **Transition planning:** Allow sufficient lead time for industry, while enabling earlier adoption for suppliers already meeting global standards.

The standards from different bodies (EN, UL, IEC and ISO) have their own nuances and differences. Some are stronger than others in various areas, for example the UL standards are typically the strongest for electrical safety for e-mobility. That said, any standard is better than none. Over time standards are learning from each other and converging. We have met with committee members from UL and IEC standards - sometimes the same person - and they are focussing on converging to common standards - this will take s-3 years.

In the meantime as stated in bullet 1, recognition of all international standards immediately and mandating verified certification to at least one, will dramatically improve safety and quality. As the underlying standards are updated, the safety levels will continue to improve. There is no silver bullet to solve all the issues overnight.

Industry Context & Principles

1. **Safety first:** Electrical and engineering integrity of e-mobility devices is non-negotiable. Fires, thermal runaway, and substandard imports pose serious risks.
2. **National consistency:** Divergent state rules undermine safety, consumer trust, and industry investment. Victoria should avoid creating a stand-alone regime.
3. **Global best practice:** Stronger standards exist internationally (UL, EN, IEC) than the standards currently accepted and proposed by ESV. Recognition of these is critical for robust safety outcomes and for widespread importer/distributor participation.

Digital solutions: Paper stickers and static certificates are inadequate and easily faked. Digital verification, product passports and unique identifiers provide enforcement tools for regulators, Border Force, and transport operators.

At the Queensland Licensing and Vehicle Safety e-Mobility Safety Reference Group meeting on 7 October 2025, a Queensland Police Senior Constable(name available) advised that people are printing fake labels and attaching them to e-mobility devices to try to avoid enforcement for non-compliant vehicles.

2. Standards Comparison

While ESV is examining this project from an electrical safety perspective, the broader standards being proposed encompass e-mobility transport safety and quality standards, including electrical. Unlike NSW, where Fair Trading has ignored the vehicle engineering areas, we urge Victoria to adopt the standards in full to cover the entire vehicle and batteries, including e-bikes, e-PMDs, and related batteries.

This will ensure a whole-of-government approach that can be leveraged for many purposes.

We welcome that ESV are in discussion with the Department of Transport and Planning on this issue.

Table 1 – System and Battery Standards

Device Type	AS/NZS Standard	EN Standard	UL Standard	Gaps/Notes
E-bikes (≤250 W)	AS 15194 (outdated, poor battery tests)	EN 15194:2017+A1 (stronger, up to 250 W, robust battery tests)	UL 2849 (system-level)	AS inadequate, needs EN/UL recognition
E-bikes (>250 W)	None – TCF only	EN 15194:2017+A1 (up to 250 W)	UL 2849 (full system)	VIC left with self-declaration
E-scooters, PLEVs	AS/NZS 60335.2.114 (Electrical only)	EN 17128 (vehicle safety + EN 50604-1 battery)	UL 2272 (system)	VIC ignores EN/UL
Battery Packs	IEC 62133-2 (cells only)	EN 50604-1 (pack + BMS, LEV-specific)	UL 2271 (pack + BMS)	IEC cell standard not enough

3. Digital Verification Model

A Digital Product Passport is Like a Human Passport.

It's not just a sticker or a piece of paper (those can be forged).

A human passport works because:

- It's unique to you.
- It can be checked instantly against a trusted system.
- It has security features that can't be copied.

Multi-factor authentication is like border control.

When you travel, they don't just look at the cover of your passport. They scan it, check your photo, and match it to a database. That's what a DPP does for every e-bike, e-scooter or battery.

If the product passes, doors open.

Once you know it's safe and legal, you can decide where it's allowed: imports, trains, buildings, public transport. The trust comes first — the rules follow.

Energy Safe Victoria is leading the conversation in Victoria for better safety and quality regulation of e-mobility and other declared electrical products. This is an opportunity to put the “digital foundation blocks” in place for other departments and regulators to leverage.

Key Elements

1. A unique fraudproof digital fingerprint (Digital ID)
 - a. This links to a product at serial number level
2. Digital ID links to verified records of the product
 - a. Certifications to standards
 - b. Manufacturing records
 - c. Serial number and VIN equivalent if desired
 - d. Proof/change of ownership, if required
 - e. etc
3. Digital Fingerprint scanned by any mobile phone
 - a. Reveals certifications and other product information
 - b. Confirms if legal or not for the location
4. Additional Information Can Be Shared
 - a. Riding Rules
 - b. Safety Information
 - c. Recycling guidelines
 - d. Charging advice
 - e. Marketing information/videos, etc if retailer

Example



Scan this fingerprint on a mobile phone at www.credzid.com/scan

The full information will be displayed. The image to the right is the first screen shown from the scan.

Scans are geolocation sensitive.

This demonstration displays NSW results.

The screenshot displays the following information:

- Image:** A black Cube e-bike.
- Status:** A green checkmark icon.
- Product Name:** Cube E-Bike
- Model:** NURIDE HYBRID PRO 500
- Brand:** CUBE logo
- Compliance:** Cube e-Bike meets NSW and Australian Regulations
- Separator:** A downward-pointing chevron icon.
- Logo:** CREDZ logo
- Compliance Section:**
 - Australian Compliance:** This vehicle has Federal approval to Australian vehicle standards (with a green checkmark icon).
 - Australian Standards:** AS 15194 Certified Australian Standard for EPAC e-bikes (with a green checkmark icon).
 - Spare Parts & Support:** Australia wide support and genuine spare parts (with a wrench icon).
 - 2-Year Warranty:** All Cube e-bikes have a 2-Year warranty (with a smiley face icon).
- Call to Action:** Click to Register your Cube Nuride Hybrid Pro 500 with 99 Bikes for exclusive offers.

Can a Digital Fingerprint Meet the “marked with a certificate number” regulatory requirement?

Here’s how Digital Fingerprints can be legally justified as an alternative to a “printed mark with certification number” under Victoria’s Electricity Safety Act 1998 (Vic) and AS/NZS 3820:2009 framework:

1. Legislative Basis — Equivalence in Function, Not Form

Section 55 of the Electricity Safety Act 1998 (Vic) allows Energy Safe Victoria (ESV) to declare equipment as “controlled electrical equipment” that must be certified and “marked accordingly” before being supplied.

Importantly, the Act does not prescribe how the mark must be applied - only that it must:

- Identify the equipment as certified, and
- Enable verification that a valid certificate of conformity exists.

A Digital Fingerprint (unique digital identifier) satisfies both functions, it identifies the product and enables verification, but does so in a digital, tamper-evident way. Therefore, it is legally equivalent in function, though not in format.

A digital fingerprint identifies a product model at the serial number level which provides even greater control and functionality than traditional printed marks.

2. Standards Alignment — Consistency with AS/NZS 3820

Under AS/NZS 3820:2009 (“Essential safety requirements for electrical equipment”), compliance may be demonstrated via:

- Marking with the certification reference, and
- Documentation or digital traceability proving conformity.

The standard’s intent is traceability and verifiability, not visual printing per se.

A digital fingerprint system:

- Provides enhanced traceability through immutable digital records,
- Allows real-time verification of certification status, manufacturer, and lab results,
- Prevents falsification or duplication, a failure of printed marks.

Thus, digital verification exceeds the assurance level contemplated by AS/NZS 3820.

3. Precedents in Other Schemes

Digital identifiers are already recognised internationally as legal compliance marks:

- EU Digital Product Passport (DPP) - allows a QR or NFC-linked compliance record. The legislation was enacted in 2023 and industry compliance is mandatory, depending on product category, from February 2027 to 2030. Lithium-ion batteries for e-mobility are in the first DPP category from February 2027. As such all Australian products could readily have these as their manufacturers also produce products for compliance in Europe.

- UKCA and CE digital marking pilots - permit digital conformity labelling for small or variable-form products.

Victoria can adopt the same principle through an administrative declaration or guidance, treating the digital fingerprint as a “mark applied to the product” that provides the same or greater regulatory assurance.

4. Enforcement and Consumer Benefits

A Digital Fingerprint provides regulators, retailers, and consumers with:

- Instant, verifiable certification lookup (via mobile phone scan or dedicated scanner)
- Cross-jurisdictional interoperability: a single Digital Product Passport can be used to verify different certification requirements and regulations from one state to another - you don't need a different label for every state.
- Tamper detection - if a device or label is different to that shown on the scanned passport, it is known to be fake. Additionally a DPP contains immutable records of the manufacturing specifications of the product. If the product performs differently or has been modified, it can be proven that it is now illegal.
- Reduced administrative burden - eliminates manual record-checking and counterfeit marks.

This approach aligns with ESV's stated policy intent in the consultation paper:

“...allow regulators, retailers, and consumers to verify compliance quickly, avoiding the current burden of document checks or technical testing”

A Digital Fingerprint directly achieves that goal.

5. Legal Framing Recommendation

We understand that ESV can formally recognise Digital Fingerprints by:

1. Issuing a Guidance Note under s.7 of the Electricity Safety Act stating that digital identifiers are a valid “mark” if they enable direct verification of certification.
2. Accepting the Digital Fingerprint as satisfying the “marking accordingly” requirement in any s.55 declaration for controlled electrical equipment.

This approach:

- Appears to be lawful within existing legislative powers,
- Delivers superior safety and traceability outcomes, and
- Supports future national and state DPP frameworks.

4. Response to Consultation Questions

Q1. Do you agree with our proposal to declare e-transport devices and associated lithium-ion batteries as “controlled electrical equipment”?

Yes. We support the declaration as controlled electrical equipment to ensure pre-market certification and marking. However, this must not be limited to batteries alone - whole devices (e-scooters, e-bikes, hoverboards, etc.) should be captured. Standalone batteries should also be included, as many owners will buy spare or replacement batteries independent of their original purchase.

Q2. Are there alternative approaches you believe would effectively manage the electrical safety risks?

Declaration is essential, but **digital verification via digital product passports** should be built into the regime. A digital fingerprint linked to a product passport (test reports, certification numbers, batch details, recalls) ensures compliance can be checked instantly by regulators, retailers, and consumers.

Importantly, they endure across the entire product life cycle and can be dynamically updated as information changes and events occur. If additional certifications are gained, they can be instantly added and verified; if regulations change, product legality can be updated instantly; if a recall is necessary, alerts can be issued directly to the passport owner.

The latest verified information is always available to the product owner or user.

The EU Commission legislated digital product passports in 2023 with applicability for e-mobility batteries from 2027 and e-bikes and ePMDs from 2030. The manufacturers selling into Europe are the same ones supplying products to Australia - the DPP requirement is something they are already implementing. Victoria would not be requiring any more than the manufacturers are already doing for Europe.

Q3. Would knowing a product is independently safety certified impact purchasing decisions?

Yes. Independent certification is critical to consumer trust. Digital transparency of that certification is equally important to prevent counterfeiting and “fake labels”. Existing international certifications by independent labs that are digitally verified or products that have been approved through the NSW process, should be accepted.

Self-declared conformity is widely abused and not reliable.

We estimate more than 50% of e-mobility devices and batteries sold in Victoria do not meet basic safety and quality standards. People are buying on price because they are not aware of the safety risks and there has not been any effective communication by Government and related bodies.

Q4. Do you agree with our draft definition for e-scooters, e-skateboards, and other e-transport devices?

No.

Defining specific form factors, such as e-scooters and e-skateboards, is regressive, narrow, and stifles innovation (and safety in some circumstances). Victoria should not create its own definition when well-constructed frameworks exist that are reinforced by various international standards for quality and safety.

The broad category is e-mobility, which also encompasses bikes and the many emerging forms of bikes and other devices.

Our view is that the broad category should be e-mobility and encompass any device and its related batteries, which can be defined by the global standards that exist:

Core Standards

Electric Personal Mobility Devices(ePMDs)/Light Electric Vehicles (LEVs)

- IEC 60335-2-114, EN 17128, UL 2272

e-Bikes

- EN 15194, UL 2849

Batteries

- IEC 62133-2, UL 2271, UL 2580, EN 50604-1

Major manufacturers of quality devices and batteries worldwide already manufacture and certify to one or more of these standards with certification by government-recognised independent laboratories.

Manufacturers should not be asked to retest and certify to narrow Victorian definitions when they have already adhered to global standards, often which are a higher bar than those currently recognised by Victoria.

No standard is perfect, and each has its nuances; however, they are constantly improving and converging towards more common requirements globally.

Other Vehicle Types - Mobility Scooters, Golf Carts, Golf Buggies/Trolleys

All of these vehicle types have experienced dangerous malfunctions resulting in fires, injuries, deaths and damages around the world. They should not be excluded as they present the same risks as the other vehicle types covered by the proposed regulation. Good-quality manufacturers of these types of devices already operate to high standards. They should be rewarded by legislation and regulations that prevent cheap and dangerous products from encroaching on their sales.

The lack of regulation of these devices is actually creating greater risks. A major fire happened at Eastern Golf Club in the Yarra Valley in October 2023. It completely destroyed the clubhouse. The charging of lithium-ion batteries caused it. Other fires have occurred at golf clubs in Australia and around the world.

The outcome is that many clubs do not allow members' buggies to be stored and charged at the golf club. Some clubs had as many as 200 members' buggies being managed by the club and generating revenue for the club. This service is now being removed, and members must charge their buggies at home. In one example, this creates 200 fire risks in unmanaged environments, compared to one in a managed environment if battery quality were mandated and enforced.

In addition to golf devices, there are significant issues with power tools and household products that should also be required to have digitally verified certifications to electrical safety standards.

Table 1 – System and Battery Standards (repeated for context)

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There are multiple versions of each of these standards, depending on when they were last updated. Victoria should adopt the NSW versions as the minimum standard for consistency, providing a clear path for manufacturers that have already undergone the NSW certification process.

Standards developed for e-mobility should be used instead of generic electrical standards.

The weather-exposed, outdoor, and high-vibration environments of e-mobility are tested to stringent e-mobility standards, taking these factors into account.

Q5. Do you agree with our draft definition for e-bikes and e-bike conversion kits?

No. See our answer to question 4.

We support EN15194, but it is a narrow definition and doesn't cover the full range of e-Bikes that should be declared. UL 2849 should also be included as it covers higher-powered e-bikes than the EN 15194 standard, and also throttle-only bikes, which are emerging as part of the e-mobility mix. UL 2849 also has more stringent electrical safety testing than EN 15194.

We do not support e-bike conversion kits as these take no account of the bike to which they are being fitted. Adding power to a pedal bike - even with certified electricals - does not make it safe. The added weight and speed puts stress on bike frames that they were not designed for as pedal bikes. It also

places greater stress on brakes, which are not designed for the speed and added weight of conversion kits.

In the current market, we do not support the legalisation or use of conversion kits without supporting standards that address the structural, mechanical, engineering, and braking issues.

Q6. Do you have suggestions for defining e-transport devices, including exclusions?

- Explicitly exclude wheelchairs and motor vehicles.
- Include seated and multi-wheel devices to avoid regulatory loopholes.

See our answers to questions 4 and 5.

Q7. What standards are your devices currently complying with?

Quality manufacturers already comply with **one or more of the standards detailed in question 4**.

Q8. Do you have comments on the shortcomings of AS 15194? How should they be addressed?

AS 15194 is based on an outdated EN version and has **critical gaps** in battery safety (no overcharge, vibration, or fire spread tests). These gaps are closed in **EN 15194:2017+A1:2023**. Victoria should recognise EN 15194 alongside AS 15194 to modernise requirements. AS 15194 is also narrow in the types of e-bikes covered - currently only up to 250 W and limited to 25 kph, and must be pedelecs.

Many bikes exist outside this narrow definition and require a standard such as UL 2849.

Q9. What would be the impact of certification to different standards in VIC and NSW?

Fragmentation would create significant cost, confusion, and compliance burden. Products could be legal in NSW (certified to UL 2849/EN 15194) but illegal in VIC. The result would be higher costs, inconsistent enforcement, and continued entry of unsafe devices through loopholes. Harmonisation is essential.

To enable this, Victorian legislation needs to be updated to broaden the definition of “relevant standard” to include the contemporary UL and EN standards.

Should Victoria choose different certification standards to NSW these can easily be managed through a digital product passport as mentioned earlier. DPPs can be “location aware” and present the appropriate results based on the location of the scan.

Q10. What guidance would you need to comply with Technical Construction File requirements?

We recommend avoiding reliance on TCFs wherever possible. They can amount to self-declaration and create enforcement challenges. Instead, mandate compliance with **international system-level standards (UL, EN, IEC)** and require the provision of evidence from accredited third-party labs. If these exist, then they can be used as evidence in a TCF process where necessary.

Q11. What would be the costs and operational impacts of certifying and marking devices?

Costs depend heavily on whether Victoria accepts global lab evidence (ILAC MRA/IECEE CB Scheme). If accepted, costs are reasonable and already factored into global supply chains. If Victoria requires “Victoria-only” certification, costs and delays will escalate significantly, with little safety benefit.

The full cost of testing and independent certification to additional standards can range from \$ [REDACTED] to \$ [REDACTED] per product. Considering a battery as a second product, the cost per vehicle could be as high as \$ [REDACTED]. This would result in quality brands withdrawing from Victoria, increasing the risk of cheap, illegal products being sold.

It will open the flood gates for bad actors who are adept at faking safety marks and the very thing that Victoria wants to avoid will be enabled as good actors will leave Victoria and consumers won't be able to buy safe products. Consumers will be left with what is being sold - unsafe and illegal products

The addition of a digital product passport at the time of manufacture can be as little as US\$ [REDACTED]/product and ensures lifetime access to certifications and other critical regulatory, safety and recycling information. It can actually reduce manufacturing costs, as one label serves multiple purposes and never needs to be updated.

Q12. What factors should be considered in assessing timing?

- Alignment with NSW timelines (2025–26). NSW brought in their regulations in 2024 and made some modifications in 2025 based on industry feedback. As a result all products sold in NSW must be fully compliant by February 2026 - around 18 months since the initial regulations were published.

As the quality manufacturers will have compliance with the NSW regulations by February 2026, a harmonised approach by Victoria could also meet this date -as the same products are sold in Victoria.

If Victoria adopts different standards, it could require up to 18 months for full compliance - hopefully less as work done to comply with NSW may make it easier for manufacturers to get certified to whatever Victoria regulates.

Further, if Victoria does regulate different standards to NSW it is likely to see some brands exit Victoria as it is not worth the additional costs and effort for yet another lack of regulatory harmony between states.

- Sufficient lead time for the industry to adapt labelling, packaging, and digital passport integration.
 - European digital product passports, effective from February 2027 (batteries). means the same manufacturers will comply with this requirement, allowing them to deliver digital

product passports for Australian products by 2027 at the latest.

- Immediate ban on clearly unsafe/non-certified devices, but staged introduction for compliant stock. This would apply to any product that does not have verified certification to the appropriate IEC, UL or EN standard.
- Consideration should be given to financial incentives for the return of illegal and dangerous products, and rebates for future purchases of compliant products.

Q13. How much time is needed to achieve compliance?

With harmonisation and acceptance of global certification, compliance could be achieved in **12 months**. Without harmonisation, duplicate testing would push compliance costs and timelines beyond 24 months. Aligning with EU digital product passport requirements from February 2027 will allow manufacturers to use common processes.

5. Conclusion

Zipidi strongly supports Victoria's leadership in addressing the electrical safety risks of e-mobility devices. To maximise safety and minimise burden, we recommend:

1. **Harmonise with NSW:** adopt the same standards, timelines, and requirements to prevent market fragmentation.
2. **Recognise international standards:** UL, EN and IEC certifications should be accepted as evidence under AS/NZS 3820, provided they are by approved independent labs and verified.
3. **Enable digital verification:** establish a Victorian/national compliance register and product passport system for enforcement and consumer trust.
4. **Plan a managed transition:** allow 12–18 months for compliance, but enable early movers to demonstrate certification through digital systems.

This balanced approach will protect Victorian consumers, support the safe growth of the industry, and prevent unnecessary duplication.