



Australian
Competition &
Consumer
Commission

Consumer product safety response to hoverboard fires

Regulation Impact Statement

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Australian Competition and Consumer Commission
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1. Purpose

- 1.1. Hoverboards have been associated with fires and smoking, overheating and sparking incidents in Australia and overseas.
- 1.2. Based on Australian and international evidence, it appears that hoverboards, or the reasonably foreseeable use of hoverboards, may cause injury to persons because of the risk of fire and overheating while charging.
- 1.3. The purpose of this regulation impact statement is to consider the viable options to address the risk of fire and therefore the risk of injury to consumers from hoverboards.

2. Background

- 2.1. Hoverboards are two wheeled ride-on devices with a single axle. A lithium-ion battery powers the hoverboard and this can be recharged from a mains supply using a charger. Hoverboards are also known as self-balancing scooters, gliders, smart boards and sky walkers. They have no steering grips or handlebars and operate like motorised skateboards, or handle-less Segways.



- 2.2. The first shipment of hoverboards to Australia was 30 July 2015. There was an influx of cheap hoverboards in the lead up to Christmas 2015. Media articles of 29 November 2015 from Lafitte, Louisiana, USA, reported fires that allegedly occurred when consumers charged their devices.
- 2.3. In early December 2015, the Australian Electrical Regulatory Authorities Council (ERAC) released guidance on the characteristics of an electrically safe hoverboard based on Australian/New Zealand and International Electrotechnical Commission (IEC) electrical safety standards.¹
- 2.4. The Australian Competition and Consumer Commission (ACCC) issued a public warning about hoverboards on 10 December 2015 alerting consumers to the spate of overseas fire incidents, and warned about the potential for falls causing injury when riding hoverboards.²

¹ Electrical Regulatory Authorities Council, Information Bulletin – Electrical safety of hoverboards and electric scooters, December 2015 <http://www.erac.gov.au/images/Downloads/Information%20Notice%20-%2013%20Electrical%20Safety%20of%20Hoverboards%20and%20Electric%20Scooters%20v1.0.pdf>

² Product Safety Australia, MR15/251 – Stay safe on hoverboards, 10 December 2015 <http://www.productsafety.gov.au/content/index.phtml/itemId/1016987>

- 2.5. In early January 2016, a house fire in Victoria from a charging hoverboard prompted the Victorian Minister for Consumer Affairs to ask the Commonwealth Minister to consider banning hoverboards.
- 2.6. On 12 January 2016 the Minister for Small Business and Assistant Treasurer, the Hon. Kelly O'Dwyer MP, issued a Safety Warning Notice³ under section 129 of the Australian Consumer Law (ACL), which is Schedule 2 to the *Competition and Consumer Act 2010* (Cth) (CCA). The Safety Warning Notice announced that the ACCC were investigating the risks associated with the use of hoverboards.
- 2.7. Since the house fire in Victoria, there have been three more house fires in NSW. All of these fires started in hoverboards that were being charged. Media reports state that two of these homes were destroyed by the fires. The ACCC is also aware of seven incidents in Australia involving hoverboards smoking, overheating or sparking and that did not result in house fires.
- 2.8. There have been overseas reports of hoverboards catching fire while being ridden. However, the ACCC is unaware of hoverboards catching fire while being ridden in Australia.

International Developments

- 2.9. On 3 December 2015, the National Trading Standards in the UK examined more than 17,000 hoverboards at border entry points. Of these, over 15,000 (88%) were assessed as unsafe, detained at the border, and many had noncompliant plugs without fuses, increasing the risk of the device overheating, exploding or catching fire.⁴
- 2.10. On 29 January 2016, Underwriters Laboratories (UL) published UL 2272 - *Outline of Investigation for Electrical Systems for Self-balancing Scooters*, a framework to evaluate, test and certify safe interaction between the battery and charger systems of hoverboards.⁵
- 2.11. On 18 February 2016, the United States Consumer Product Safety Commission (CPSC) published a letter to hoverboard suppliers⁶ urging them to supply safe hoverboards that comply with the UL 2272 voluntary standard. The CPSC also said that lithium-ion battery products must comply with test requirements under UN/DOT 38.3 *Transport of Dangerous Goods for Lithium Metal and Lithium Ion Batteries*. The CPSC suggested that non-compliant hoverboards may be seized or recalled.

3. The problem and the need for government action

- 3.1. The ACCC has identified two types of safety hazards with hoverboards:
 - personal injuries from falls and crashes – including overseas rider deaths from falls in traffic

³ Product Safety Australia, CPN No.1 of 2016 Safety Warning Notice (Hoverboards) <http://www.productsafety.gov.au/content/index.phtml/itemId/1017472>

⁴ *Thousands of unsafe 'hoverboards' detained over past seven weeks*, National Trading Standards UK, 3 December 2015, <http://www.nationaltradingstandards.uk/news/thousands-of-unsafe-hoverboards-detained-over-past-seven-weeks/>

⁵ *The facts about hoverboards and UL testing*, Underwriters Laboratory <http://ul.com/hoverboards/> (23 February 2016).

⁶ US CPSC letter to suppliers of hoverboards, see <http://www.cpsc.gov/Global/Business-and-Manufacturing/Business-Education/SelfbalancingScooterLetter.pdf?epslanguage=en> (22 February 2016).

- hazards associated with explosions, fires and smoking, overheating and sparking incidents.

The ACCC is currently focusing on reducing the risk of injury and death to consumers resulting from the hazards associated with explosions, fires and smoking, overheating and sparking incidents. International product safety regulators in the US and the UK are also focussing on these hazards.

- 3.2. The ACCC has information about hoverboard incidents from state and territory fire authorities and electrical safety regulators in Queensland, New South Wales and Victoria. Additionally, between 11 November 2015 and 24 February 2016, 124 consumers contacted the ACCC call centre to report hoverboard concerns and incidents.
- 3.3. The ACCC is aware of four house fires in Australia associated with hoverboards with two homes destroyed:
 - 4 January 2016 in Strathmore Victoria, a new hoverboard that was being charged caught fire and damaged the house beyond repair. The damage estimate is \$500,000.
 - 31 January 2016 in Cobar NSW, a hoverboard being charged caught fire. Timber floorboards burnt through where the hoverboard was sitting. Fire damage was quite localised.
 - 13 February 2016 in Berala NSW, a hoverboard being charged in a child's bedroom caught fire. The bedroom was completely destroyed and there was significant smoke and heat damage to the remainder of the house.
 - 4 March 2016 in Marayong NSW, a hoverboard that was being charged caught fire. Media reports state that the fire destroyed the house.
- 3.4. The ACCC is also aware of seven incidents in Australia between November 2015 and early March 2016 involving hoverboards smoking, overheating or sparking and that did not result in house fires.
- 3.5. Reports from Australian electrical safety regulators and fire authorities after investigations of fires associated with hoverboards indicate that the observable fire damage suggests that the fires were likely to have started in hoverboard batteries that were being charged at the time.
- 3.6. This is consistent with the experience in other countries. The US CPSC received over 50 reports of hoverboard-related fires causing more than \$2 million in property damage across 24 states between 1 December 2015 and 17 February 2016. The CPSC investigation found that a number of hoverboards had inadequate electrical control circuitry to prevent lithium-ion battery over charging, overheating or excessive battery current flow.
- 3.7. Based on Australian and international evidence, it appears the fires and other incidents are most likely caused by hoverboards with one or more of the following characteristics:
 - they contain substandard lithium-ion batteries
 - they are designed and manufactured with substandard mechanical protection for the batteries

- they are designed and manufactured with substandard electrical circuitry that does not include adequate over-current, over-temperature or over-charging protection for the batteries
- they have non-compliant electrical chargers.

Lithium-ion battery hazards

- 3.8. Hoverboards contain a rechargeable battery pack of multiple lithium-ion batteries arranged in a combination to power the device.
- 3.9. Any energy storage device can have potential risks and the lithium-ion battery is no exception. Sony commercialised the lithium-ion battery in 1991 and manufacturers now use these batteries extensively in many products, including portable electronic equipment and electric or hybrid-electric vehicles.
- 3.10. Lithium-ion batteries offer some advantages over other batteries, including higher energy density, no 'memory effect' and lighter weight batteries.
- 3.11. Lithium-ion batteries are prone to 'thermal runaway' where the battery rapidly releases its stored energy to create significant heat. During 'thermal runaway', lithium-ion batteries may vent flammable gases that ignite. Battery cases can rupture and eject battery contents, spreading fire to other batteries and causing electrical short-circuits and sparking. This is an established and understood phenomenon of lithium-ion batteries. 'Thermal runaway' can occur during battery charging, appliance use or during storage of a charged battery.⁷
- 3.12. Low quality lithium-ion batteries are particularly prone to 'thermal runaway' because they may not have been safety tested, may be poorly designed or contain manufacturing flaws.⁸
- 3.13. There appear to be several technologies available that product designers can use to reduce the likelihood and severity of 'thermal runaway' to acceptable levels in most lithium-ion battery applications, including:⁹
- the quality of the batteries needs to be managed
 - the batteries need to be mechanically protected inside the product
 - the battery needs electrical circuitry to protect against high electrical currents and short circuits during charging and during use.

These technologies increase the cost of the finished product but they appear to be readily available and relatively inexpensive.

- 3.14. The Australian Dangerous Goods Code specifies that lithium batteries transported by land must comply with test requirements under the United Nations Manual of Tests and Criteria (UN) 38.3 *Transport of Dangerous Goods for Lithium Metal and Lithium Ion Batteries*. Similar requirements also apply to air and marine transport of these batteries. A range of Australian agencies administers these transport safety

⁷ Safety of Lithium-ion batteries, RECHARGE – The European Association for Advanced Rechargeable Batteries June 2013

⁸ *Did you know that Lithium Batteries are Dangerous Goods* - Canada Transport 21/05/2015.

⁹ Lisboa, D. and Snee, T., 2011, *A review of hazards associated with primary lithium and lithium-ion batteries*, Process Safety and Environment al Protection 89 pp. 437-438.

requirements. These arrangements do not address the safety of consumers using lithium-ion battery powered products such as hoverboards.

Electrical Chargers

- 3.15. Australian state and territory electrical safety regulations require electrical equipment to be shown to be electrically safe and, at a minimum, to meet Australian/New Zealand electrical safety standards.
- 3.16. Investigation of the hoverboard implicated in the Victorian fire revealed that the electrical charger supplied with the device was non-compliant with electrical safety regulations. Electrical safety regulators across Australia moved quickly to identify further non-compliant chargers in the market and many hoverboards and/or their chargers are now subject to recall.
- 3.17. As of 16 March 2016, suppliers had voluntarily recalled 19 hoverboards to remedy non-compliant battery chargers. The recalls affect between approximately 5,500 - 6000 hoverboards.¹⁰
- 3.18. The electrical safety regulatory framework has delivered product recalls that will manage the safety risks associated with non-compliant chargers. Suppliers are responding to the recalls by replacing the chargers or taking product returns. The regulators are engaged in ongoing market surveillance and further recalls are likely. However, consumers who only receive a replacement charger could still have a hoverboard with inadequate electrical or mechanical protection for the battery, or a poorly designed battery.

Electrical Safety Regulations

- 3.19. The Australian Electrical Regulatory Authorities Council (ERAC) guidance for hoverboards published in December 2015, recommends certain IEC and Australian/New Zealand standards (AS/NZS) for electrical chargers, lithium-ion batteries and electrical appliances as the electrical safety requirements for hoverboards in Australia.¹¹
- 3.20. Consultations with hoverboard suppliers indicate that most of the hoverboards they supplied in Australia did not comply with the IEC or AS/NZS requirements. However, prompted by the ERAC guidance, some Australian suppliers have tested their products to the recommended IEC standards. At least one hoverboard appears to satisfy the relevant IEC and AS/NZS requirements. The ACCC expects that a small number of further hoverboard models may satisfy those requirements in coming weeks. A much larger segment of the hoverboard market is unlikely to comply with these safety requirements in the near future.
- 3.21. Electrical safety regimes vary between the States and Territories. The electrical safety laws in all states and territories address hoverboard electrical chargers since they operate at mains voltage (240 volts AC). Energy Safe Victoria (ESV) has

¹⁰ Hoverboard Safety Concerns, 17 February 2016 <http://www.recalls.gov.au/content/index.phtml/itemId/1081137>

¹¹ Electrical Regulatory Authorities Council, Information Bulletin – Electrical safety of hoverboards and electric scooters, December 2015 <http://www.erac.gov.au/images/Downloads/Information%20Notice%20-%2013%20Electrical%20Safety%20of%20Hoverboards%20and%20Electric%20Scooters%20v1.0.pdf>

advised the ACCC that the electrical safety legislation in Victoria allows them to adequately manage both charger and battery safety issues in hoverboards. However, ESV and NSW Fair Trading both suggest that the electrical safety laws in most Australian states and territories cannot enforce the ERAC guidance in relation to hoverboard batteries and battery control systems since hoverboards operate at a lower voltage (generally below 50 volts).

- 3.22. Regulatory gaps in electrical safety laws in most Australian States and Territories indicate that the ACL is currently the most appropriate legislative regime to address immediate safety issues with hoverboards, noting that state and territory electrical safety laws already address the electrical chargers.
- 3.23. The ACCC and the electrical safety regulators are in the process of reviewing UL 2272 as a complement to the ERAC guidance based on IEC standards, and as part of a possible long term solution to addressing the safety issues for hoverboards. UL 2272 has been designed specifically to assess the safety of the electrical drive train system and battery and charger combination of hoverboards.
- 3.24. As noted previously, the US CPSC recently wrote to hoverboard suppliers urging compliance with UL 2272. The ACCC understands that currently no hoverboards have been certified to comply with UL 2272 but that some suppliers are testing hoverboards to the standard.

Summary of the safety concerns identified

- 3.25. Australian electrical safety regulators are responsible for regulating the safety of mains connected hoverboard chargers.
- 3.26. Australian electrical safety regulators have advised the ACCC that hoverboards should include lithium-ion batteries and control systems that provide a basic level of safety. Those control systems should prevent battery over charging and battery overheating, and limit the battery current flow and the internal current flows between individual cells within the battery pack.
- 3.27. The publicly available reports on the safety of lithium-ion batteries support that advice.
- 3.28. The ACCC concludes that as a minimum, hoverboards should include appropriate components and electrical circuitry to safely manage:
 - battery charging;
 - battery discharging;
 - battery temperature control; and
 - unbalanced charge in multiple lithium-ion battery cells.
- 3.29. At this stage, the ACCC has not concluded its investigation of the mechanical protection of lithium-ion batteries in hoverboards. Inadequate mechanical protection can lead to lithium-ion battery damage during transport or use. This could trigger an immediate overheating incident or a latent problem that occurs during battery charging. The ACCC currently has no evidence to suggest that this has led to a safety incident and the other safety requirements should act to prevent mechanical damage to the battery from leading to a fire. The ACCC and electrical safety regulators are investigating this question further, including arranging further testing of hoverboards.

Market considerations

- 3.30. Preliminary figures obtained from the Department of Immigration and Border Protection (DIBP) estimate that importers brought close to 69,000 hoverboards into Australia since 1 July 2015. This does not include an estimated 31,000 online sales where the manufacturer sold directly to consumers. There is therefore an estimated 100,000 hoverboards with consumers or in domestic supply chains awaiting sale.
- 3.31. The price of hoverboards varies widely from about \$100 to over \$1,000. Assuming an average price of \$200 per hoverboard, the ACCC estimates all of the hoverboards in Australia are worth about \$200 million.
- 3.32. The ACCC estimates that there are hundreds of online suppliers of hoverboards to Australia. Identifying all of these suppliers and checking compliance and safety of their products will take significant time and resources.
- 3.33. If suppliers voluntarily put effective mechanisms in place to ensure substandard circuitry, batteries and chargers are not used, government intervention to restrict supply would not be required. However, current evidence suggests that many suppliers have not put these mechanisms in place.
- 3.34. Australian consumers may have already made their purchases over the Christmas period while the product was novel. Some major Australian retailers have reportedly recently stopped supplying hoverboards. Recent media attention and the 19 recalls in place to date may have acted to reduce the sales of these products. However, the sales or import data that could answer this question is not yet available.
- 3.35. There are a number of units already in the retail supply chain and in homes. ACL regulators that identify unsafe hoverboards that are at risk of fire may need to negotiate voluntary recalls with individual suppliers. Where a voluntary recall cannot be negotiated, the Minister may need to consider ordering a compulsory recall.
- 3.36. The ACCC will continue to work with stakeholders to determine whether further voluntary recalls should be conducted to prevent consumers from using unsafe hoverboards. Government action may not completely fix the problem. Despite the best efforts of both regulators and suppliers, it is possible that a small number of unsafe hoverboards will continue to be supplied, such as where a consumer purchases directly from an overseas manufacturer. Quality control processes can fail and it is impractical to test every unit before supply, so despite a supplier's best efforts, an unsafe hoverboard may still be supplied.
- 3.37. The recent actions by international safety regulators are likely to have reduced the size of the global market for hoverboards substantially. Manufacturers may be holding large stocks of substandard hoverboards that they may seek to supply to Australia at low prices. Some online suppliers may continue to market hoverboards to Australia regardless of the safety concerns and regardless of government intervention.

4. Policy options

- 4.1. A number of policy options to address the immediate risk of hoverboard fires and the related risk of injury or death are set out below. As the ACCC's investigation continues, it may identify and consider other viable policy options as part of a longer term solution.

Option 1 – Maintain the status quo

- 4.2. Australian regulators are currently assisting hoverboard suppliers with voluntary recalls of non-compliant chargers and raising consumer awareness of the potential dangers of hoverboards. Several regulators, including electrical safety regulators and consumer affairs agencies such as the ACCC have issued safety warnings about hoverboards and about the recalls via a range of media.
- 4.3. Electrical regulators continue to monitor the market for non-compliant electrical chargers. Under the status quo, the ACCC would continue to monitor voluntary recalls of hoverboards with non-compliant electrical chargers negotiated by electrical safety regulators.
- 4.4. ACL regulators including the ACCC would continue to monitor incidents of fires and injuries from hoverboards and, subject to resources and priorities, survey the market and test hoverboards to selected parts of recognised standards such as UL 2272 and relevant IEC standards. Where an ACL regulator found that a particular hoverboard model was demonstrably unsafe, they could negotiate with the supplier to recall it from the market.
- 4.5. Regulators would continue targeted messaging to suppliers and consumers to make them aware of the safety hazards when charging and using hoverboards.
- 4.6. One currently supplied hoverboard model appears to satisfy the ERAC electrical safety requirements. A small number of further models may soon be available. This would reduce the need for regulation but most hoverboard suppliers are unlikely to comply with these safety requirements in the near future.

Benefits

- Suppliers are able to continue to sell hoverboards.
- Consumers are free to purchase a wide range of hoverboards.
- Consumers may become more aware of the hazards associated with the products.
- If targeted messaging makes it clear that some of these hazards cannot be self-assessed then consumers may make informed decisions about whether to purchase hoverboards.
- Suppliers would not have to incur additional costs from further regulation.

Limitations

- This option would not remove unsafe products from sale and suppliers are likely to continue supplying unsafe hoverboards to consumers. There would be an ongoing risk of fires and related hazards and therefore an ongoing risk of property damage, injury or death.
- The costs of recent house fires that have occurred under the status quo are difficult to estimate precisely at this stage. The recent house fire in Strathmore, Victoria caused by a hoverboard did estimated \$500,000 damage to the home.¹² The NSW fire departments have not yet released information regarding the costs of the house fires in New South Wales.

¹² Solution to overheating lithium-ion batteries close: study, Sydney Morning Herald, 11 January 2016
<http://www.smh.com.au/technology/technology-news/solution-to-overheating-lithiumion-batteries-close-study-20160111-gm3gkr.html>

- Regulators would be unable to identify and commence work to negotiate the voluntary recall of unsafe hoverboards without extensive testing of individual products or until after investigating a hoverboard fire or similar incident.

Option 2 – Restrict supply of unsafe hoverboards – recommended

- 4.7. The ACCC has identified immediate and serious concerns in relation to hoverboard safety due to electrical hazards arising from poor product design. It is unlikely that all or even most hoverboards currently meet the specific safety requirements specified in UL 2272 or the IEC standards recommended by Australian electrical safety regulators.
- 4.8. Under the ACL the Commonwealth Minister has the power to restrict the supply of hoverboards by:
- making a safety standard (Option 2a)
 - imposing a permanent ban (Option 2b)
 - proposing an interim ban (Option 2c)
 - imposing an interim ban on all hoverboards (Option 2d)
 - imposing an immediate interim ban on hoverboards that do not meet specific safety requirements (Option 2e).
- 4.9. The ACCC recommends Option 2e for the reasons detailed below.

Option 2a – Making a safety standard

- 4.10. Under section 104 of the ACL, the Commonwealth Minister can make a safety standard for a consumer good of a particular kind, consisting of such requirements about specific matters as are reasonably necessary to prevent or reduce the risk of injury.
- 4.11. It normally takes several months to develop and implement a safety standard under the ACL. The time taken to develop a safety standard would delay action and expose consumers to unnecessary risk of injury.
- 4.12. This option is not recommended.

Option 2b – Imposing a permanent ban

- 4.13. Under section 114 of the ACL, the Commonwealth Minister may impose a permanent ban on consumer goods of a particular kind. However, the ACCC is still investigating the risks posed by hoverboards, and exploring the possibility of addressing the problem under state and territory electrical safety regulations. It is therefore more prudent to consider an interim ban in the first instance.
- 4.14. This option is not recommended.

Option 2c – Proposing an interim ban

- 4.15. Under section 109 of the ACL, the Commonwealth Minister can impose an interim ban on consumer goods where it appears to the Minister that consumer goods will or may cause injury or a reasonably foreseeable use of the goods will or may cause injury.

- 4.16. An interim ban on the supply of certain hoverboards would prevent consumers from purchasing unsafe hoverboards and give ACL regulators time to assess the breadth of the problem. It would also allow electrical regulators to determine an appropriate course of action for a long term response to the issue.
- 4.17. Interim bans last for 60 days, but may be extended for up to a further 30 days under section 111(2) of the ACL and an additional 30 days under section 111(6).
- 4.18. The Minister can propose an interim ban and offer suppliers 10 days to ask the ACCC to hold a conference. The ACCC would hold such a conference five days or more after the notice period ends.
- 4.19. This option is not recommended.

Benefits:

- This option, which invites affected hoverboard suppliers to request a conference with the ACCC, gives suppliers the opportunity to be heard in relation to the proposed ban. Suppliers would also be able to provide any evidence that they have about the safety of their products, and comment on the scope of the proposed ban.

Limitations:

- Offering suppliers the opportunity to request a conference with the ACCC delays the imposition of any interim ban by two to three weeks. Given the number of reported fires caused by hoverboards since the Minister issued the Safety Warning Notice on 12 January 2016, there are serious risks associated with further delay.
- Some suppliers may discount existing stock in order to sell it before the ban takes effect (i.e. product dumping). This could lead to increased consumer risk.
- The ACCC has already consulted actively with known hoverboard suppliers, including about the possibility of an interim ban. Suppliers provided valuable information that has influenced the development of this RIS and the analysis of the policy options.

Option 2d – Imposing an interim ban on all hoverboards (either immediately or after a conference)

- 4.20. This option would ban the supply of all hoverboards while the ACL and electrical safety regulators continue to investigate longer term options for allowing supply of safe goods. Electrical regulators, ACL regulators and international safety experts are still investigating the various causes of fires and ways to reduce the likelihood of incidents.
- 4.21. This option could be applied after a conference (Option 2c) or immediately (as described as part of Option 2e).
- 4.22. This option is not recommended.

Benefits

- A ban on all hoverboards would give regulators time to investigate the cause of the fires and seek ways to mitigate their occurrence. Consumers and regulators would not be reliant on suppliers complying with requirements of a more limited ban.
- Hoverboards associated with fires in Australia have involved different brands and models. Regulators have not identified the precise cause of each hoverboard fire. Non-compliant electrical chargers, overcharging battery packs, inadequate electrical

protection, poor design, mechanical damage, or another factor associated with the hoverboard could have caused the fires.

- Given this uncertainty, a ban on all hoverboards could reduce the risk of hoverboard fires to a greater degree than a limited ban or safety standard based on specified safety requirements.

Limitations

- Suppliers who consider that their hoverboards are safe would not be able to sell their products and could see this as an unfair restriction on their business.
- Consumers would no longer be able to purchase hoverboards irrespective of their level of safety.
- Some stakeholders may see this as heavy handed, particularly if a more limited ban based on specified safety requirements is viable.

Option 2e – Immediate ban on hoverboards that do not meet specified safety requirements – recommended

- 4.23. A ban could be limited in scope to hoverboards that do not meet specified safety requirements. The Australian ERAC guidance for hoverboards published in December 2015 could form the basis for those requirements. The ERAC guidance referenced particular IEC and Australian/New Zealand electrical safety standards for lithium-ion batteries and household appliances.
- 4.24. An interim ban could also specify safety requirements from the Underwriters Laboratories voluntary standard *UL 2272 – Outline of Investigation for Electrical Systems for Self-balancing Scooters*.
- 4.25. The requirements would include those that Australian electrical safety regulators have advised are important to provide a basic level of safety for hoverboards. These are requirements about lithium-ion batteries and battery control systems to:
 - prevent battery overcharging
 - limit battery current flow
 - control battery temperature
 - limit voltage imbalance within the battery pack.
- 4.26. Suppliers could sell hoverboards in Australia that met specific tests of UL 2272, or the relevant IEC or AS/NZS standards, that address these requirements.
- 4.27. However, Underwriters Laboratories only recently published UL 2272 and the ACCC understands that there has been insufficient time for suppliers to test and certify their hoverboards to the standard. The ERAC guidance for hoverboards has been available for longer and several Australian suppliers have, or are likely to have, hoverboards that meet the IEC or AS/NZS standards recommended by ERAC available for retail sale very soon.
- 4.28. The Minister can impose an immediate interim ban if it appears to the Minister that the consumer goods create an imminent risk of death or serious injury.
- 4.29. An immediate interim ban would allow the Minister to act to address the serious risks associated with these products. The ACCC considers that risk of death or serious injury is imminent, given the frequency of fires since the Minister issued the Safety Warning Notice on 12 January 2016. The latest fire completely destroyed the home

and could have resulted in death or serious injury had smoke alarms not been in place.

- 4.30. In order to implement an immediate interim ban the Minister would need to certify that an interim ban on consumer goods should be imposed immediately because it appeared that there was an imminent risk of death, serious illness or serious injury. The interim ban would come into effect the day after the ACCC registered it with the Federal Register of Legislation.
- 4.31. The Minister would also need to offer suppliers the opportunity to conference with the ACCC about the interim ban after it came into force. The post-ban conference process would give suppliers opportunity to shape the longer term policy for when the interim ban expired.
- 4.32. This option is recommended.

Benefits

- The ban would be imposed immediately and therefore immediately protect consumers from the supply of hoverboards that do not meet specified safety requirements.
- This option gives state and territory electrical safety regulators time to clarify their regulatory reach and to agree a pathway to the longer term safety of hoverboards and lithium-ion powered products under the electrical safety framework.
- Suppliers could still supply hoverboards that provide an adequate level of safety.
- This option would reduce the risk of product dumping discussed in option 2c.

Limitations

- This option effectively requires hoverboard suppliers to source lithium-ion batteries that comply with recognised safety standards (either UL or IEC) and to have their hoverboards tested by an electrical safety test laboratory in relation to the safety of the battery control system. The ACCC has obtained indicative quotes that suggest that this testing would cost about \$3,300 per hoverboard model and take about one month to complete.
- A ban will not address the products that consumers have already purchased. The ACCC will negotiate additional voluntary recalls with individual suppliers where unsafe hoverboards are identified. Where a voluntarily recall cannot be negotiated, the Minister may need to consider ordering a compulsory recall.
- This option targets the safety features of hoverboards that electrical safety regulators have recommended as important, based on the evidence of the fires and other incidents reported in Australia to date. However, as discussed in section 3, there are other ways that lithium-ion battery products may theoretically fail and create a safety hazard. For example, mechanical shock to a hoverboard both during manufacture and in normal use can damage a lithium-ion battery potentially creating a safety hazard later. This option does not include those additional requirements because there is no evidence that indicates that these types of failure are associated with any of the hoverboard fires to date.
- It is possible, therefore, that a limited ban will not prevent the supply of all potentially hazardous hoverboards that may cause fire, resulting in a risk of injury. Regulators should consider this residual risk in more detail as additional evidence, input from suppliers, and advice from other Australian and international regulators become available.

Option 3 – Compulsory recall by Minister

- 4.33. Under section 122 of the ACL, the Commonwealth Minister can issue a recall notice for unsafe consumer goods if it appears that the suppliers have not taken satisfactory action to prevent the goods causing injury. This also has the effect of banning the supply of those goods.
- 4.34. This option is not recommended. However, this option could support, as necessary, the other options for bans, if voluntary recall cannot be negotiated.

Benefits

- This option would require the recall of unsafe hoverboards currently supplied and in the possession of consumers.
- This option could also require suppliers to provide consumers with a refund and suppliers would be responsible for arranging safe disposal of the returned products.
- It would also prevent the future supply of the recalled hoverboards.

Limitations

- It must appear to the Minister that each affected supplier's hoverboards will or may cause injury and that the supplier had not taken satisfactory action to prevent the goods causing injury.
- Suppliers are likely to face additional costs under this option. Given that repair or replacement of the hoverboard may not be available (because of the nature of the dangerous characteristics of hoverboards), suppliers could be required to provide a refund to consumers. There would also be costs involved in disposal of any recalled hoverboards.

Recommended option

Based on the information currently available to the ACCC, and in the interests of reducing imminent serious risks to consumers as soon as is reasonable in the circumstances, the most appropriate action is to impose an immediate interim ban on hoverboards that do not meet specified safety requirements.

5. Implementation and evaluation

- 5.1. The ACCC will continue to support suppliers with their hoverboard recalls.
- 5.2. The first step in imposing an immediate interim ban is for the Minister to certify that an interim ban on consumer goods be issued immediately.
- 5.3. If the Minister imposes an immediate interim ban then the ban notice needs to be registered on the Federal Register of Legislation, accompanied with an Explanatory Statement that explains the reasons for the interim ban.
- 5.4. The ACCC recommends imposing an interim ban on hoverboards that do not meet the specific test requirements of UL 2272, or of the relevant IEC (or Australian/New Zealand equivalent) standards recommended by Australian electrical safety regulators, that address the safety of the lithium-ion battery and the battery control systems of the hoverboard. The specific standards and sections of those standards are detailed below.

| Requirement | UL option | IEC (or AS/NZS) option |
|-------------------------------|--|---|
| Battery | Section 16 of UL 2272 <ul style="list-style-type: none"> - Compliance with this section will in effect require full compliance with the UL 2580 battery standard for batteries used in electric vehicles | Full compliance with the: <ul style="list-style-type: none"> - IEC 62133 battery safety standard for portable applications |
| Battery control system | Requires compliance with the following sections of UL 2272: <ul style="list-style-type: none"> - Sections 11, 15.1, 15.2, 15.3, 15.4, 15.5, 23, 24, 26 & 27 - These sections relate to safety controls for the battery system | Requires compliance with section 11 – Heating and section 19 – Abnormal operation (both as amended by Annex B <i>Appliances powered by rechargeable batteries</i>) of either: <ul style="list-style-type: none"> - IEC 60335-1 Household electrical appliances general safety standard <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> - AS/NZS 60335.1 Household electrical appliances general safety standard (which mirrors IEC 60335-1) |

- 5.5. The Minister would then need to invite affected suppliers to request a conference with the ACCC under s132E of the CCA.
- 5.6. If this option is accepted, the ACCC will move quickly to hold a post-ban conference if one or more suppliers asks to do so. If the ACCC holds a conference, it will then make further recommendations to the Minister as quickly as possible.

6. Consultation

- 6.1. In mid-March 2016, the ACCC contacted all known hoverboard suppliers and advised them that the ACCC was considering options to reduce the risk of house fires caused by hoverboards and that one of the options under consideration was an interim ban on hoverboards that do not meet specific safety requirements of UL 2272. Suppliers were also alerted that, because of the imminent risk of death or serious injury, such a ban could possibly be imposed very soon.
- 6.2. The ACCC invited suppliers to make submissions about the options being considered. The ACCC received thirty two submissions.
- 6.3. A number of submissions suggested that hoverboards that meet the requirements of the IEC standards recommended by ERAC should be excluded from any ban. In light of those submissions and the ERAC guidance recommending the IEC standards, Option 2e (the recommended option) was amended to include the IEC standards in addition to UL 2272.

- 6.4. The post-ban conference process provides affected suppliers with an opportunity to discuss the interim ban and the way it affects them. The ACCC would take the information gathered during the conference into account to determine whether the interim ban should be maintained, extended or revoked and whether there is another more appropriate way to address the problem.
- 6.5. An appropriately revised Regulation Impact Statement would inform such a decision.