

## REPLACEMENT EXPLANATORY STATEMENT

Issued by the Authority of the Minister for Small Business and Assistant Treasurer

*Competition and Consumer Act 2010*

*Consumer Protection Notice No.7 of 2016*

*Consumer Goods (Self-balancing Scooters) Safety Standard 2016*

The Commonwealth Minister for Small Business and Assistant Treasurer (the Minister) has made a safety standard for self-balancing scooters (previously referred to as hoverboards) pursuant to section 104 of the *Australian Consumer Law (ACL)*, which is Schedule 2 of the *Competition and Consumer Act 2010 (Cth) (CCA)*.

The safety standard comes into effect on 17 July 2016, immediately after an interim ban on hoverboards that do not meet specific safety requirements ends.

The purpose of the safety standard is to reduce the risk of death or serious injury to consumers from house fires associated with self-balancing scooters. The safety standard reduces the risk by specifying safety requirements for rechargeable lithium-ion batteries and battery control systems in self balancing scooters.

### **The requirements in the safety standard**

The safety standard includes the following definitions:

- *AS/NZS 60335.1:2011* means *AS/NZS 60335.1:2011 (incorporating amendment Nos 1, 2 and 3) (IEC TEXT) Household and similar electrical appliances—Safety Part 1: General requirements (IEC 60335-1 Ed 5.1, MOD)*.
- *IEC 62133* means *IEC 62133 Edition 2.0 2012-12 - Secondary cells and batteries containing alkaline or other non-acid electrolytes - Safety requirements for portable sealed secondary cells, and for batteries made from them, for use in portable applications*.
- *IEC 60335-1* means *IEC 60335-1 Edition 5.1 2013-12 Household and similar electrical appliances - Safety - Part 1: General requirements*.
- *UL 2272* means *UL 2272 – Outline of Investigation for Electrical Systems for Self-Balancing Scooters, Issue Number: 1*.

The safety standard applies to the supply of self-balancing scooters and requires that they comply with **either**:

- (1) the following International Electrotechnical Commission (IEC) standards :
  - a. for batteries, as specified in *IEC 62133*; and
  - b. for battery control systems preventing electrical appliances from attaining excessive temperatures in normal use, as specified in section 11 as amended by Annex B, of *IEC 60335-1* or as specified in section 11 as amended by Annex B, of *AS/NZS 60335.1:2011*; and
  - c. for battery control systems preventing abnormal operation of electrical appliances, as specified in section 19, as amended by Annex B, of *IEC 60335-1* or as specified in section 19, as amended by Annex B, of *AS/NZS 60335.1:2011*;

or

- (2) the requirements specified in the following sections of the Underwriters Laboratories Inc. (UL) document *UL 2272* for:
- a. Fuses as specified in section 11 of *UL 2272*
  - b. Protective circuits and safety analysis as specified in sub-sections 15.1, 15.2, 15.3, 15.4 and 15.5 of *UL 2272*
  - c. Cells as specified in section 16 of *UL 2272*
  - d. Overcharging as specified in section 23 of *UL 2272*
  - e. Short circuit protection as specified in section 24 of *UL 2272*
  - f. Temperature control as specified in section 26 of *UL 2272*
  - g. Cell imbalanced charging as specified in section 27 of *UL 2272*.

### **International Electrotechnical Commission and Underwriters Laboratories standards**

The IEC is an international organisation that prepares and publishes international standards for electrical and electronic technologies.

*IEC 62133* sets out safety requirements for portable sealed secondary (rechargeable) cells and for batteries made from cells for use in portable applications. The version of *IEC 62133* incorporated in the safety standard was published in December 2012.

*IEC 60335-1* specifies general safety requirements for household and similar electrical appliances. Section 11 specifies requirements to reduce the risk that appliances and their surroundings will overheat. Section 19 specifies requirements to reduce the risk of hazards, including fire hazards, as a result of abnormal operation. The version of *IEC 60335-1* incorporated in the safety standard was published in December 2013.

*AS/NZS 60335.1* adopts relevant sections of *IEC 60335-1*. The version of *AS/NZS 60335.1* referenced in the safety standard was published on 29 April 2011 and reissued incorporating Amendment No. 1 (June 2012), Amendment No. 2 (November 2014) and Amendment No. 3 (November 2015).

Underwriters Laboratories Inc. has developed and published an Outline of Investigation for Electrical Systems for Self-Balancing Scooters, *UL 2272*, which includes requirements for the electrical drive train system, including the battery and charger system combinations, for electric-powered self-balancing scooters. The requirements of *UL 2272* specified in the safety standard require self-balancing scooters to comply with sections that cover the batteries and electrical circuitry to reduce fire risk. The version of *UL 2272* incorporated in the safety standard is Issue 1 and it was published on 29 January 2016.

The *IEC 62133* and *IEC 60335-1* standards can be purchased from a variety of online sources including the IEC ([webstore.iec.ch/](http://webstore.iec.ch/)), SAI Global ([infostore.saiglobal.com/store/](http://infostore.saiglobal.com/store/)) and the International Organization for Standardization ([www.iso.org/iso/store.htm](http://www.iso.org/iso/store.htm)).

The *AS/NZS 60335.1* standard can be purchased from SAI Global ([infostore.saiglobal.com/store/default.aspx](http://infostore.saiglobal.com/store/default.aspx)).

The first edition of *UL 2272* can be purchased from Underwriters Laboratories Inc. ([www.comm-2000.com/](http://www.comm-2000.com/)).

The cost of these standards varies between AUD\$120 and AUD\$900. The Australian Competition and Consumer Commission (ACCC) can make a copy of these standards available for public viewing in an ACCC office, subject to licensing conditions.

### **Risk of death or serious injury resulting from fires caused by self-balancing scooters**

Self-balancing scooters have been associated with fires, and smoking, overheating and sparking incidents, in Australia and overseas.

In Australia, there have been six reports of house fires attributable to self-balancing scooters, resulting in the destruction of three houses. In five cases, the self-balancing scooter was being charged when it caught fire.

There have also been seven further reports of incidents involving smoking, overheating or sparking of self-balancing scooters while charging.

Reports from Australian electrical safety regulators and fire authorities after investigations of fire associated with self-balancing scooters indicate that observable fire damage suggests that the majority of fires were likely to have started in self-balancing scooter batteries that were being charged at the time.

This is consistent with the experience in other jurisdictions. On 18 February 2016, the United States Consumer Product Safety Commission (CPSC) stated it had received over 50 reports of self-balancing scooters related fires across 24 US states. The CPSC's investigation of self-balancing scooters has found that a number do not have adequate electrical control circuits to prevent lithium-ion battery over charging, excessive battery current flow and battery temperature control.

Based on the Australian and international evidence, it appears that self-balancing scooters, or their reasonably foreseeable use, may cause injury to persons, as a result of the risk of fire and overheating while charging.

Electrical safety regulators from Queensland, New South Wales and Victoria have provided advice that, to reduce the risk of an electrical fire, as a minimum, self-balancing scooters should include appropriate components and electrical circuitry to safely manage battery charging; battery discharging; temperature control and unbalanced charge in multiple lithium-ion battery cells.

### **Previous interim ban on hoverboards that do not meet specific safety requirements**

The Minister imposed an interim ban on hoverboards (now described as self-balancing scooters) that do not meet specific safety requirements on 18 March 2016, pursuant to section 109 of the ACL. The interim ban commenced on 19 March 2016 and was in force for 60 days. The interim ban was imposed to address the risk of death or serious injury from fires associated with hoverboards. The safety requirements specified in the interim ban reduce the risk of fire in rechargeable lithium-ion batteries in the hoverboard, and thereby reduce the risk of injury to consumers.

The Minister extended the interim ban period for 30 days, commencing on 18 May 2016, pursuant to section 111 (2) of the ACL. The Minister extended the interim ban period for a further 30 days commencing on 17 June 2016, pursuant to section 111(6) of the ACL. The interim ban ends on 16 July 2016.

In the period since the interim ban was imposed, there has been one fire incident. The self-balancing scooter involved was purchased before the interim ban was imposed. The interim

ban and the notices extending the ban period are registered on the Federal Register of Legislation – [www.legislation.gov.au/Details/F2016L00357](http://www.legislation.gov.au/Details/F2016L00357).

The safety standard requires that self-balancing scooters, sold in Australia after the interim ban ends, continue to meet the safety requirements specified in the interim ban.

## **Consultation**

### *Interim ban*

Section 131E of the CCA provides that a safety standard made under section 104 of the ACL is a legislative instrument for the purposes of the *Legislation Act 2003* (Cth). Section 17 of the *Legislation Act 2003* requires that the rule maker should consult prior to making a legislative instrument.

Prior to the imposition of the interim ban, the ACCC contacted all known hoverboard (now referred to as self-balancing scooters) 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 a recommendation to the Minister that she impose an interim ban on hoverboards that do not meet specific safety requirements of *UL 2272*. Suppliers were invited to make submissions to the ACCC in response to the options being considered. Thirty two submissions were received.

A number of submissions suggested that hoverboards that meet the requirements of the IEC standards referred to above should also be excluded from any interim ban. The Electrical Regulatory Authorities Council (ERAC) had also stated that hoverboard battery charging functionality, ancillary electronics and supply units could be assessed against the IEC standards.

In light of submissions and statements by ERAC on the suitability of the IEC standards as well as supplier feedback, the proposed interim ban was amended to exclude hoverboards that comply with the IEC standards (or alternatively the AS/NZS standards which adopt the relevant sections of *IEC 60335-1*).

### *Supplier conference*

A conference with suppliers and electrical safety regulators about the imposition of the interim ban was held by the ACCC at the request of suppliers, pursuant to section 132E of the CCA. The conference provided an opportunity to obtain feedback from suppliers and to discuss any concerns relating to the interim ban. This information provided by suppliers assisted the ACCC in forming a recommendation to the Minister pursuant to section 132G of the CCA that the interim ban should remain in force and not be varied or be revoked.

### *Post interim ban regulatory options*

In May 2016, the ACCC released a consultation paper outlining the possible regulatory options for self-balancing scooters once the interim ban ends. Stakeholders were requested to comment on their preferred option. They were also asked to comment on proposals to broaden the scope of regulation to capture single wheeled scooters and to change the name of the regulated products to self-balancing scooters. Fourteen submissions were received.

A summary of submissions is included in the RIS at Attachment 1.

**Commencement**

This legislative instrument commences on the day specified in the instrument, which is 17 July 2016.

**Period of effect**

This legislative instrument is effective for a period of two years from the commencement date. This instrument ends on the day specified in the instrument, which is 16 July 2018.

**Disallowance**

This legislative instrument is not subject to disallowance due to section 44 of the *Legislation Act 2003*.

**Sunsetting**

This legislative instrument is not subject to sunsetting due to section 54 of the *Legislation Act 2003*.

**Attachment 1****Consumer product safety response to self-balancing scooter fires****Regulation impact statement**



# Consumer product safety response to self-balancing scooter fires

## Regulation Impact Statement

27 June 2016

Office of Best Practice Regulation Reference – 20516

Australian Competition and Consumer Commission  
23 Marcus Clarke Street, Canberra, Australian Capital Territory, 2601

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## 1. Summary

- 1.1. The Minister for Small Business and Assistant Treasurer, the Hon Kelly O'Dwyer MP, pursuant to section 109 of the Australian Consumer Law (ACL) imposed an interim ban on the sale of unsafe hoverboards that do not meet specified safety standards. The interim ban came into effect on 19 March 2016 and applies to hoverboards (now referred to as self-balancing scooters) supplied into or within Australia. The interim ban was extended twice and ends on 16 July 2016.
- 1.2. The interim ban was imposed because hoverboards had been associated with four house fires in Australia since January 2016, including two that destroyed the house. Since the interim ban was initially imposed, the ACCC has become aware of another two house fires associated with hoverboards, including one that destroyed the house. Fall and traffic hazards are not addressed by the interim ban.
- 1.3. The ACCC consulted with suppliers before and after the interim ban came into effect and held a post-ban conference with suppliers and electrical regulators. In developing regulatory options, we considered stakeholder feedback and regulatory action in several overseas jurisdictions. The regulatory options proposed in this regulation impact statement (RIS) are a medium-term solution to the risk of fire posed by self-balancing scooters. Any regulatory option adopted would be specified for a two-year period. This would allow sufficient time for State and Territory electrical safety regulators to align their electrical safety legislation and provide a long-term solution to unsafe self-balancing scooters.
- 1.4. Four policy options have been developed to reduce the risk of death and injury resulting from self-balancing scooter fires:
  - Option 1: No further action once the interim ban ends (no specific regulation for the supply of self-balancing scooters).
  - Option 2: Permanent ban on self-balancing scooters that do not meet specific safety requirements.
  - Option 3: Mandatory safety standard for self-balancing scooters with the same requirements as the interim ban.
  - Option 4: Mandatory safety standard for self-balancing scooters with additional requirements to the interim ban.
- 1.5. The ACCC consulted with self-balancing scooter suppliers, electrical safety regulators and consumer groups about these options. Submissions received from these stakeholders have been taken into account in this RIS.
- 1.6. Cost/benefit analysis indicates that options 2 and 3 are likely to result in net benefits. Option 3 is recommended because it will reduce the risk of fire and it results in the greatest net benefit.
- 1.7. A new Australian/New Zealand voluntary standard for self-balancing scooters is being developed and is expected to be completed later this year. Once completed it may provide another suitable option for the regulation of self-balancing scooters.
- 1.8. Self-balancing scooters can be manufactured with appropriate electrical and battery components to mitigate the risk of fires, smoking and sparking, so as to provide an appropriate level of safety for consumers. Therefore a permanent ban on all self-balancing scooters is not considered to be a necessary or suitable regulatory option.

## 2. Purpose

- 2.1. Self-balancing scooters have been associated with fires and smoking, overheating and sparking incidents in Australia and overseas.
- 2.2. Based on the Australian and international evidence, self-balancing scooters, or the reasonably foreseeable use of self-balancing scooters, may cause injury to persons because of the risk of fire and overheating.
- 2.3. The purpose of this RIS is to consider the viable medium term options under the ACL to address the risk of fire, smoking and sparking, and therefore the risk of injury to consumers, from self-balancing scooters. In the longer term, the state and territory electrical safety regimes are expected to be the most appropriate framework to ensure the safety of consumer electronic products, including self-balancing scooters.

## 3. Background

### Interim ban background

#### Interim ban without delay

- 3.1. On 18 March 2016, the Minister imposed the interim ban notice pursuant to section 109 of the ACL - <https://www.legislation.gov.au/Details/F2016L00357>.
- 3.2. Prior to recommending that the Minister impose the interim ban, the ACCC submitted a draft copy of the RIS to the Office of Best Practice Regulation (OBPR) for early assessment.
- 3.3. The Minister's decision to impose the interim ban was informed by the draft RIS.
- 3.4. Prior to the imposition of the interim ban, 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. A summary of consultation is provided below.
- 3.5. Submissions were taken into account in drafting the interim ban notice.
- 3.6. In accordance with the ACCC's recommendation, the Minister certified that the interim ban should be imposed without delay pursuant to section 132J of the Competition and Consumer Act 2010 (CCA) on the basis that it appeared to her that goods subject to the ban imposed an imminent risk of death or serious injury.
- 3.7. The ACCC registered the interim ban on the Federal Register of Legislation and the ban came into effect on 19 March 2016.

#### Conference

- 3.8. On 18 March 2016, the Minister also signed a notice inviting hoverboard suppliers to notify the ACCC if they wished the ACCC to hold a conference about the interim ban on hoverboards. Six suppliers requested a conference. The conference was held on 11 April 2016. In addition to the suppliers requesting the conference, it was attended by a number of other suppliers and representatives of Energy Safe Victoria (ESV) and the New South Wales electrical safety regulator who were invited to attend by the ACCC pursuant to section 132H(1)(c) of the CCA.

- 3.9. The information provided during the conference informed the ACCC recommendation to the Minister pursuant to section 132G of the CCA that the interim ban should remain in force and should not be varied or revoked. The ACCC provided a copy of the draft RIS to the Minister when it made this recommendation.
- 3.10. Prior to recommending that the interim ban should remain in force, the ACCC submitted a draft updated copy of the RIS to OBPR for early assessment.
- 3.11. On 23 April 2016, the Minister announced that the interim ban would remain in force and would not be varied or revoked.<sup>1</sup>

#### **Compliance with the interim ban**

- 3.12. Following testing, a number of suppliers have advised the ACCC that their products meet the safety requirements of the interim ban and that they have restarted selling hoverboards.

#### **Extension of interim ban**

- 3.13. The first period for the interim ban on hoverboards that do not meet specific safety requirements ended on 17 May 2016. Before the first interim ban period ended, the Minister extended the ban for a further 30 days.<sup>2</sup> The Minister further extended the interim ban and it will end on 16 July 2016.<sup>3</sup>

### **Australia's consumer product safety framework**

- 3.14. The Australian consumer product safety framework is underpinned by the ACL which took effect on 1 January 2011. The ACL strengthened the consumer product safety provisions to enhance consumer protection.
- 3.15. There are a number of provisions in the ACL which, in conjunction with the common law, provide significant incentives for business to supply safe goods in Australia. In addition, Part 3-3 of the ACL contains specific provisions to address safety related market failure. Commonwealth, State and Territory ministers have powers to regulate consumer goods and product-related services in certain circumstances by publishing safety warning notices, imposing interim bans or issuing compulsory recall notices (in relation to goods only). In addition, the Commonwealth Minister has the power to make or declare mandatory safety standards and impose permanent bans. These specific provisions are considered in circumstances of safety related market failure.
- 3.16. The Minister is given discretion in the exercise of safety related powers. The exercise of this discretion involves consideration of a broad range of issues, which will vary on a case by case basis but include the nature and extent of the risk of injury, and the economic cost of the regulation.

### **The regulated product**

- 3.17. In previous draft RISs and in the interim ban, the product was described as a 'hoverboard'. Following consultation with stakeholders, the product is now described as a 'self-balancing scooter'.

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<sup>1</sup> Kelly O'Dwyer, *Hoverboard interim ban to remain*, 23 April 2016 - <http://www.kellyodwyer.com.au/hoverboards-interim-ban-to-remain/>

<sup>2</sup> *The Australian Consumer Law extension of the ban period for the interim ban on hoverboards that do not meet specific safety requirements*, Federal Register of Legislation, 13 May 2016, <https://www.legislation.gov.au/Details/F2016L00797>

<sup>3</sup> Kelly O'Dwyer *Hoverboards interim ban extended by another 30 days*, 16 June 2016 - <http://kmo.ministers.treasury.gov.au/media-release/070-2016/>

- 3.18. Previously hoverboards were defined in the interim ban as:  
*Two-wheeled ride-on devices with a single axle and no steering grips or handlebars; powered by a lithium-ion battery that is rechargeable via connection to a mains power supply.*
- 3.19. For any future regulation, the definition will be amended and self-balancing scooters defined as:  
*Two-wheeled ride on devices with no steering grips, seats or handlebars; powered by a lithium-ion battery that is rechargeable via connection to a mains power supply. Self-balancing scooters are also known as hoverboards, gliders, smart boards, sky walkers or mod boards.*
- 3.20. This is similar to the description in the Underwriters Laboratories UL 2272 *Outline of Investigation for Electrical Systems for Self-balancing Scooters* (although the UL description includes single-wheeled ride-on devices).



- 3.21. Self-balancing scooters were imported into Australia through 2015, with an influx of cheap self-balancing scooters in the lead up to Christmas 2015.

### **Initial concerns about self-balancing scooters**

- 3.22. 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.<sup>4</sup>
- 3.23. The ACCC issued a public warning about hoverboards (self-balancing scooters) on 10 December 2015 alerting consumers to the spate of overseas fire incidents and warned about the potential for falls causing injury when riding them.<sup>5</sup>
- 3.24. In early January 2016, a house fire in Victoria from a charging self-balancing scooter prompted the Victorian Minister for Consumer Affairs to ask the Commonwealth Minister to consider imposing a ban on the products.

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<sup>4</sup> 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>

<sup>5</sup> Product Safety Australia, MR15/251 – Stay safe on hoverboards, 10 December 2015 <http://www.productsafety.gov.au/content/index.phtml/itemId/1016987>

- 3.25. The Minister published a Safety Warning Notice<sup>6</sup> under section 129 of the ACL on 12 January 2016. The Safety Warning Notice announced that the ACCC was investigating the risks associated with the use of hoverboards (now described as self-balancing scooters).
- 3.26. Since the house fire in Victoria, there have been four house fires in NSW and one in Tasmania taking the total of known house fires to six. Five of these fires started while the self-balancing scooter was being charged. Authorities are unsure whether the self-balancing scooter that caused the Tasmanian fire was charging at the time the fire started. The damage caused to three of these houses was so significant that the houses were irreparable. The ACCC is also aware of seven incidents in Australia since November 2015 involving self-balancing scooters smoking, overheating or sparking but which did not result in house fires.
- 3.27. There have been overseas reports of self-balancing scooters catching fire while being ridden. However, the ACCC is unaware of any reports of self-balancing scooters catching fire while being ridden in Australia.

### International developments

- 3.28. Media articles from 29 November 2015 from Lafitte, Louisiana, USA, reported fires that allegedly occurred when consumers charged their self-balancing scooter.<sup>7</sup>
- 3.29. On 3 December 2015, the National Trading Standards in the UK examined more than 17,000 self-balancing scooters 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.<sup>8</sup>
- 3.30. In December 2015, Amazon stopped selling all self-balancing scooters and commenced a safety review of the products. In February 2016, Amazon decided not to return self-balancing scooters to their websites and offered customers who had purchased a self-balancing scooter a full refund.<sup>9</sup>
- 3.31. 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 self-balancing scooters.<sup>10</sup> On 18 February 2016, the United States Consumer Product Safety Commission (CPSC) published a letter to self-balancing scooter suppliers<sup>11</sup> urging them to supply safe self-balancing scooters 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 self-balancing scooters may be seized or recalled. The CPSC has not provided any further guidance on self-balancing scooters.

<sup>6</sup> Product Safety Australia, CPN No.1 of 2016 Safety Warning Notice (Hoverboards) <http://www.productsafety.gov.au/content/index.phtml/itemId/1017472>

<sup>7</sup> 'Exploding' hoverboard blamed for destroying Lafitte family's home, WGNO ABC, 29 November 2015, <http://wgno.com/2015/11/29/exploding-hoverboard-blamed-for-destroying-lafitte-familys-home/>

<sup>8</sup> *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/>

<sup>9</sup> *Amazon stope selling some hoverboards over safety*, USA Today, 14 December 2015, <http://www.usatoday.com/story/tech/personal/2015/12/14/amazon-stops-selling-some-hoverboards-over-safety/77275814/>

<sup>10</sup> *The facts about hoverboards and UL testing*, Underwriters Laboratory <http://ul.com/hoverboards/> (23 February 2016).

<sup>11</sup> 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).

- 3.32. On 15 February 2016, New Zealand changed the status of many low voltage devices, including self-balancing scooters, to 'medium-risk' articles. All 'medium-risk' articles require a certificate of conformity before they can be sold in New Zealand. Energy Safety New Zealand now require suppliers to provide documentary evidence that self-balancing scooters comply with AS/NZS 60335.2.82 and AS/NZS 60335.1.1 Edition 5.1 and that chargers supplied with self-balancing scooters comply with AS/NZS 61558.2.16 or AS/NZS 61558.2.6.<sup>12</sup>
- 3.33. An Australian supplier reported to the ACCC that since early May 2016, eBay have removed all sale listings for self-balancing scooters across all eBay websites. Media articles support this report.<sup>13</sup>
- 3.34. A Chinese national standard for self-balancing scooters is being developed by government agencies and self-balancing scooter suppliers. It is anticipated that the standard would come into effect in 2017.<sup>14</sup>
- 3.35. A detailed summary of international regulatory responses to date is provided in Attachment A.

## 4. The problem and the need for government action

- 4.1. The ACCC has identified two types of safety hazards with self-balancing scooters:
- personal injuries from falls and crashes – including overseas rider deaths from falls in traffic
  - hazards associated with explosions, fires and smoking, overheating and sparking incidents.
- 4.2. The ACCC is currently focusing on reducing the risk of injury and death to consumers resulting from the hazards resulting from explosions, fires and smoking, overheating and sparking incidents. International product safety regulators in the US and the UK are also focussing on these hazards.
- 4.3. The ACCC has obtained information about self-balancing scooter 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 self-balancing scooter concerns and incidents.
- 4.4. As noted above, the ACCC is aware of six house fires in Australia associated with self-balancing scooters with three homes destroyed:
- 4 January 2016 in Strathmore Victoria, a new self-balancing scooter that was being charged in a bedroom caught fire and damaged the house beyond repair.
  - 31 January 2016 in Cobar NSW, a self-balancing scooter being charged caught fire. Timber floorboards burnt through where the self-balancing scooter was sitting. Fire damage was localised.

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<sup>12</sup> *Electric scooter hoverboards now have strict safety compliance requirements*, TradeMe, 2 February 2016, <http://www.trademe.co.nz/trust-safety/2016/2/2/electric-hoverboard-scooters/>

<sup>13</sup> *Hoverboard fire victim and suppliers blast ineffective ban*, News.com.au, 12 May 2016, <http://www.news.com.au/technology/hoverboard-fire-victim-and-suppliers-call-for-more-action-as-ban-fails-to-stop-risks/news-story/75a8112683253da4ada10874202f82c2>

<sup>14</sup> *Self-balancing scooters to get standard*, Shanghai Daily.com, 11 May 2016, <http://www.shanghaidaily.com/business/it/Selfbalancing-scooters-to-get-standard/shdaily.shtml>

- 12 February 2016 in Clarendon Vale TAS, a self-balancing scooter caught fire and destroyed the house. Electrical Safety in Tasmania is now investigating.
  - 13 February 2016 in Berala NSW, a self-balancing scooter 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 self-balancing scooter that was being charged in the living room caught fire. NSW fire authorities have confirmed that the fire destroyed the house.
  - 20 April 2016 in NSW, the battery pack exploded while being charged in a child's bedroom, scattering fragments across the room, up-to-the ceiling.
- 4.5. The ACCC is also aware of seven incidents in Australia between November 2015 and early March 2016 involving self-balancing scooters smoking, overheating or sparking, which did not result in house fires.
- 4.6. Reports from Australian electrical safety regulators and fire authorities after investigations of fires associated with self-balancing scooters indicate that the observable fire damage suggests that the majority of fires were likely to have started in self-balancing scooter batteries that were being charged at the time.
- 4.7. This is consistent with the experience overseas. The US CPSC received over 50 reports of self-balancing scooter 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 self-balancing scooters had inadequate electrical control circuitry to prevent lithium-ion battery overcharging, overheating or excessive battery current flow.
- 4.8. Based on Australian and international evidence, it appears the fires and other incidents are most likely caused by self-balancing scooters 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.
- 4.9. There is a higher risk of fires in self-balancing scooters than other products containing lithium-ion batteries because of:
- the nature of the product – lithium-ion batteries in other products such as laptops are not subject to extreme weight loads from rider use
  - the high current capacity – self-balancing scooters can deliver high current in a short space of time, compared to a lithium-ion battery in a laptop, increasing the risk of fire in certain circumstances

- the use of the product – different models provide different information about use, including whether riders should use the product in wet conditions or on an incline, and the maximum weight of a rider
- abuse of the product – unlike many other products containing lithium-ion batteries, the self-balancing scooter can undergo significant abuse due to the nature of its design. Inexperienced riders can ride the product into walls, curbs, stairs etc. and cause mechanical trauma to the cells within the lithium-ion battery.
- rapid growth in demand – the novelty of the self-balancing scooter around Christmas in 2015 increased demand for the product significantly. This increased demand was matched with poor quality control and sourcing practices by some suppliers to quickly and cheaply meet demand. This is consistent with submissions received by the ACCC.

### **Lithium-ion battery hazards**

- 4.10. Self-balancing scooters contain a rechargeable battery pack of multiple lithium-ion cells arranged in a combination to power the device.
- 4.11. Any energy storage device has 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.
- 4.12. Lithium-ion batteries offer some advantages over other batteries, including higher energy density, no ‘memory effect’ and lighter weight batteries.
- 4.13. 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.<sup>15</sup>
- 4.14. 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.<sup>16</sup>
- 4.15. 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:<sup>17</sup>
  - 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.

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<sup>15</sup> Safety of Lithium-ion batteries, RECHARGE – The European Association for Advanced Rechargeable Batteries June 2013.

<sup>16</sup> *Did you know that Lithium Batteries are Dangerous Goods* - Canada Transport 21/05/2015.

<sup>17</sup> Lisbona, D. and Snee, T., 2011, *A review of hazards associated with primary lithium and lithium-ion batteries*, Process Safety and Environmental Protection 89 pp. 437-438.



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

- 4.16. 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 administer these transport safety requirements. These arrangements do not address the safety of consumers using lithium-ion battery-powered products such as self-balancing scooters.

### **Summary of the safety concerns identified**

- 4.17. Australian electrical safety regulators have advised the ACCC that self-balancing scooters should include lithium-ion batteries and control systems that provide a basic level of safety. Those control systems should prevent battery overcharging and battery overheating, and limit the battery current flow and the internal current flows between individual cells within the battery pack.
- 4.18. The published reports on the safety of lithium-ion batteries support that advice.
- 4.19. The ACCC concludes that in order to minimise the risk of death and injury from house fires, as a minimum, self-balancing scooters should include appropriate components and electrical circuitry to safely manage each of the following:
- battery charging
  - battery discharging
  - battery temperature controls
  - unbalanced charge in multiple lithium-ion battery cells.
- 4.20. An unattended charging self-balancing scooter fire is likely to accelerate more rapidly than a fire where residents are close by and able to be alerted. Five of the six house fires started by self-balancing scooters occurred while charging and some of these were charging in unattended bedrooms. Therefore, residents may not be aware of the initial ignition of the unit. NSW Fire & Rescue estimate that once a fire starts, home owners have approximately three minutes to escape safely.<sup>18</sup>
- 4.21. In the case of one of the house fires, the battery pack exploded, scattering fragments around the room. Fragments were found embedded in the wall and the ceiling of the residence. In these circumstances, fragments may spread the fire more rapidly throughout the room.<sup>19</sup>
- 4.22. An exploding lithium-ion battery pack could also seriously lacerate a person nearby.

### **Electrical chargers**

- 4.23. 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.

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<sup>18</sup> House fires on the rise across NSW, reports Fire & Rescue NSW, 5 January 2016, <http://www.smh.com.au/nsw/house-fires-on-the-rise-across-nsw-reports-fire--rescue-nsw-20160105-glzq5r.html>

<sup>19</sup> Hoverboard fire victim and suppliers blast ineffective ban, 12 May 2016, <http://www.news.com.au/technology/hoverboard-fire-victim-and-suppliers-call-for-more-action-as-ban-fails-to-stop-risks/news-story/75a8112683253da4ada10874202f82c2>

- 4.24. Investigation of the self-balancing scooter implicated in the Victorian fire in January 2016 revealed that the electrical charger supplied with the device was non-compliant with electrical safety regulations.
- 4.25. Electrical safety regulators have identified a number of self-balancing scooter chargers that are non-compliant with electrical safety standards and these regulators and the ACCC, have worked with suppliers of affected products to facilitate voluntary recalls. Twenty-one self-balancing scooters have been recalled, primarily because they were supplied with non-compliant electrical chargers, not because the self-balancing scooter itself was unsafe.<sup>20</sup>
- 4.26. Suppliers are responding to the recalls by replacing the chargers or accepting product returns.
- 4.27. These recalls affect between approximately 5500 – 6000 self-balancing scooters.<sup>21</sup>
- 4.28. The electrical safety regulators are engaged in ongoing market surveillance and further recalls are likely. However, consumers that receive a replacement charger may still have a self-balancing scooter with inadequate electrical or mechanical protection for the battery, or a poorly designed battery.

### Electrical safety regulations

- 4.29. The Australian Electrical Regulatory Authorities Council (ERAC) published guidance for self-balancing scooters in December 2015, which 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 self-balancing scooters in Australia.<sup>22</sup>
- 4.30. Prompted by the ERAC guidance, some Australian suppliers tested their products to the recommended IEC standards. Following the imposition of the interim ban, a number of additional suppliers obtained specific testing against these IEC standards or the UL standard. The ACCC understands that a number of self-balancing scooters are now certified to comply with the safety requirements specified in the ban.
- 4.31. Electrical safety regimes vary between the states and territories. The electrical safety laws in all states and territories apply to self-balancing scooter electrical chargers since they operate at mains voltage (240 volts AC).
- 4.32. Energy Safe Victoria (ESV) has advised the ACCC that the electrical safety legislation in Victoria allows them to adequately manage both charger and battery safety issues in self-balancing scooters.
- 4.33. Section 54 of the *Electricity Safety Act 1998* (Victoria) states (in part):

*A person must not supply or offer to supply electrical equipment unless -*  
 (a) *the equipment complies with the minimum standards prescribed for equipment of that class*

<sup>20</sup> Seven suppliers recalled self-balancing scooters in addition to the chargers because they lacked confidence that paperwork supplied with the self-balancing scooters was accurate and they therefore had concerns about the product's safety.

<sup>21</sup> Hoverboard Safety Concerns, 17 February 2016 <http://www.recalls.gov.au/content/index.phtml/itemId/1081137>

<sup>22</sup> 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>

- 4.34. The minimum prescribed standard is *AS/NZS 3820 - Essential safety requirements for electrical equipment* and in Victoria electrical equipment means: Any appliance, wire, fitting, cable, conduit or apparatus that generates, uses, conveys or controls (or that is intended to generate, use, convey or control) electricity. Therefore, self-balancing scooters are covered.
- 4.35. ESV plans to prohibit the sale of self-balancing scooters in Victoria unless they have issued a Certificate of Compliance for that model. The ESV prohibition is likely to require full compliance with the Australian/New Zealand electrical safety standard for household appliances (AS/NZS 60335.1), which includes more general electrical safety requirements. The prohibition notice is unlikely to allow the sale of self-balancing scooters that only meet UL 2272 or that only meet the AS/NZS 60335.1 requirements specified in the interim ban.
- 4.36. 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 self-balancing scooter batteries and battery control systems because self-balancing scooters operate at a low voltage (generally below 50 volts) which is outside the scope of their laws.
- 4.37. Regulatory gaps in electrical safety laws in most Australian states and territories mean that the ACL is the most appropriate legislative regime to address immediate safety issues with self-balancing scooters. However, if state and territory electrical safety regulations are amended in the near future to include extra low voltage devices such as self-balancing scooters, the state and territory electrical safety regime will become the most appropriate regime to regulate these products.
- 4.38. Regulation of all components of a self-balancing scooter (i.e. charger, batteries and main scooter body) via the electrical safety framework would reduce stakeholder confusion about which agency (ACCC or electrical safety regulators) is responsible for regulating these products.
- 4.39. ESV has advised the ACCC that the Joint Technical Committee EL-002 - Safety of Household and Similar Electrical Appliances is expected to have an Australian/New Zealand voluntary standard for self-balancing scooters published by the end of 2016.
- 4.40. The ACCC will continue to work with all electrical safety regulators to achieve a suitable long term solution under the state and territory electrical safety laws.

## **Market considerations**

- 4.41. Preliminary figures obtained from the Department of Immigration and Border Protection (DIBP) estimate that importers brought about 70 000 self-balancing scooters into Australia from 1 July 2015 to February 2016. In addition, there were online sales of just over 30 000 where the manufacturer sold directly to consumers. At the time the interim ban was imposed, there was therefore an estimated 100 000 self-balancing scooters with consumers or in domestic supply chains awaiting sale.
- 4.42. The price of self-balancing scooters varies widely from about \$100 to over \$1 000. Assuming an average price of \$200 per self-balancing scooter, the ACCC estimates all of the self-balancing scooters in Australia are worth about \$20 million.<sup>23</sup>
- 4.43. The ACCC is aware that there are many online suppliers of self-balancing scooters to Australian consumers. The ACCC is actively monitoring a number of online suppliers

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<sup>23</sup> A previous Regulation Impact Statement had an incorrect figure of \$200 million.

and has a program of surveillance for online products. ESV has separately stated that they also work closely with online platforms and that a majority of their supply audits are for online sales. State and territory ACL regulators also have their own monitoring and surveillance programs.

- 4.44. DIBP administers prohibited import regulations. Where goods are banned outright, without the need for testing against specific requirements, the DIBP may be able to intercept those goods at the border. Assessment of compliance with a ban (with technical requirements similar to the interim ban) or a safety standard for self-balancing scooters will require product testing. Compliance cannot be determined via visual inspection.
- 4.45. Despite these regulatory activities and controls imposed by many online platforms, given the number of online suppliers selling products directly to Australian consumers, there remains a risk that potentially hazardous self-balancing scooters will be sold in Australia.
- 4.46. 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 online suppliers have not put these mechanisms in place.
- 4.47. Australian consumers may have made their purchases over the 2015 Christmas period while the product was novel. Some major Australian retailers have recently reported that they have stopped supplying self-balancing scooters and other suppliers have stated that since Christmas, business has slowed significantly and in some cases, they have stopped selling self-balancing scooters. Recent media attention, the interim ban and the 21 recalls in place to date may have contributed to the reduction in sales of these products.
- 4.48. The recent actions by international safety regulators are likely to have reduced the size of the global market for self-balancing scooters substantially. Manufacturers may be holding large stocks of substandard self-balancing scooters that they may seek to supply to Australia at low prices. Some online suppliers may continue to market self-balancing scooters to Australia regardless of the safety concerns and regardless of government intervention. Suppliers that attended the conference on the interim ban raised these concerns.

### **Government action**

- 4.49. Regulation that applies at the point and time of supply is a proactive response to an unsafe good and is likely to be more effective than relying on a voluntary or compulsory recall to reduce the risk of fire from an unsafe good.
- 4.50. A recall may be the most viable response for unsafe self-balancing scooters that have already been purchased and being charged in homes. ACL regulators that identify unsafe self-balancing scooters 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.
- 4.51. The regulatory options discussed are unlikely to eliminate all fire risk associated with unsafe self-balancing scooters. Regulation is expected to significantly reduce the risk of house fire, but it is unlikely that this risk will be reduced to zero.
- 4.52. Government action is unlikely to completely eliminate the fire risk posed by hoverboards. Despite the best efforts of both regulators and suppliers, it is possible

that a small number of unsafe self-balancing scooters will continue to be supplied. Quality control processes can fail and it is impractical to test every unit before supply.

- 4.53. Prior to the imposition of the interim ban, a large number of self-balancing scooters were sold in Australia. There remains a risk of fire associated with these products, and the regulatory options discussed below will not reduce the risk of fire caused by products already supplied to consumers.
- 4.54. The product life span of self-balancing scooters varies and depends on how the scooter is used. However, suppliers indicate that the average life span for a self-balancing scooter is three to five years. Therefore, products sold prior to the interim ban may continue to pose a risk of fire for the foreseeable future.
- 4.55. Under the regulatory options discussed below, safe self-balancing scooters with a reduced risk of fire will be able to be sold in Australia and consumer confidence in self-balancing scooters should improve.

## 5. Policy options

- 5.1. The proposed regulatory options are a medium-term solution and would be specified for a two-year period. This time frame would allow for the State and Territory electrical regulators to align their legislation and regulations to ensure they can regulate the supply of safe self-balancing scooters via electrical safety laws.
- 5.2. As noted above, a new Australian/New Zealand standard for self-balancing scooters may be developed towards the end of 2016. The Commonwealth could declare this new standard to be a mandatory safety standard. However, the interim ban will lapse well before this standard is published. The resulting regulatory gap would expose consumers to unsafe self-balancing scooters, therefore this option is not considered suitable.
- 5.3. A permanent ban on all self-balancing scooters is not considered. As the regulatory options outlined below highlight, the electrical and battery components for self-balancing scooters can appropriately minimise the safety concerns with self-balancing scooters, and accordingly a permanent ban on all self-balancing scooters would be inappropriate.
- 5.4. The ACCC has set out below the policy options to mitigate the risk of self-balancing scooter fires and the related risk of injury or death:
  - Option 1: No further action once the interim ban ends (no specific regulation for the supply of self-balancing scooters).
  - Option 2: Permanent ban on self-balancing scooters that do not meet specific safety requirements.
  - Option 3: Mandatory standard for self-balancing scooters with the same requirements as the interim ban.
  - Option 4: Mandatory standard for self-balancing scooters with additional requirements to the interim ban.

**Table 5.1: Summary of standards discussed below.**

<b>Standard</b>	<b>Description</b>
<b>UL 2272</b>	UL 2272 – Outline of Investigation for Electrical Systems for Self-balancing Scooters.
<b>IEC 60335-1</b>	IEC 60335-1 Household electrical appliances general safety standard
<b>AS/NZS 60335.1</b>	AS/NZS 60335.1 Household electrical appliances general safety standard (which adopts, with national modifications, IEC 60335-1).
<b>UL 2580</b>	UL 2580 – Batteries for use in electric vehicles
<b>IEC 62133</b>	IEC 62133 battery safety standard for portable applications

### **Option 1 – No further action once the interim ban ends (no specific regulation for the supply of self-balancing scooters)**

- 5.5. Under this option, suppliers would be free to supply all self-balancing scooters following the expiration of the interim ban. The general requirements of the ACL would still apply, as would state and territory electrical safety requirements (for chargers only).
- 5.6. State and territory electrical safety regulators would continue to monitor the market for non-compliant electrical chargers. The ACCC would continue to monitor recalls of self-balancing scooters with non-compliant electrical chargers negotiated by electrical safety regulators.
- 5.7. ACL regulators, including the ACCC, would continue to have responsibility for monitoring incidents of fires and injuries from self-balancing scooters and for surveying the market and testing the safety of self-balancing scooters. The requirements in the expired interim ban would help regulators to establish whether a particular self-balancing scooter model may cause injury. Where an ACL regulator found that a supplier had not taken satisfactory action to prevent a self-balancing scooter causing injury, they could negotiate with the supplier for a voluntary recall..
- 5.8. Regulators would continue targeted messaging to suppliers and consumers to make them aware of the safety hazards when storing, charging and using self-balancing scooters. A small number of suppliers present at the conference held in relation to the interim ban expressed a preference for this option due to the difficulty in negotiating testing services at a reasonable cost. The ACCC has now provided suppliers with information about test laboratories that can provide suitable testing services. Some suppliers have taken steps to ensure the supply of safe self-balancing scooters, however, others have elected to no longer supply self-balancing scooters and have not had their products tested. Without some form of regulation, the supply of unsafe self-balancing scooters may resume.
- 5.9. As noted above, when the interim ban was imposed, the market for self-balancing scooters had declined from its pre-Christmas 2015 high. Media reports on house fires both in Australia and overseas are likely to have exacerbated this natural post-Christmas sales decline. The interim ban is likely to have further impacted the market. If no regulatory action is taken after the interim ban ends, the market may

experience a step increase in sales although given on-going consumer concern about the risk of self-balancing scooter fires, it is reasonable to assume that sales are unlikely to return to the level immediately before the interim ban was imposed.

- 5.10. Consumers unwilling to purchase self-balancing scooters may be attracted towards other consumer electronics products such as electric scooters. Self-balancing scooter suppliers affected by a reduction in demand for self-balancing scooters may decide to supply other consumer electronics products.

### **Benefits**

- 5.11. Suppliers are able to continue to supply self-balancing scooters and those that stopped selling after the interim ban was imposed could restart supply without the need to comply with any regulation (other than electrical safety regulations for the chargers).
- 5.12. Consumers would be able to purchase a wide range of self-balancing scooters.
- 5.13. Suppliers would not have to incur additional costs from regulation.
- 5.14. There would be no barrier to entry to new suppliers.
- 5.15. The cost of self-balancing scooters for consumers is likely to be lower than under the other regulatory options under consideration.

### **Limitations**

- 5.16. This option would not prevent unsafe products from being sold and suppliers are likely to resume supplying unsafe self-balancing scooters to consumers. There would be an increased risk of fire and related hazards leading to an ongoing risk of property damage, serious injury or death.
- 5.17. The costs of recent house fires that have occurred are difficult to estimate precisely at this stage. The recent house fire in Strathmore, Victoria caused by a self-balancing scooter is reported to have caused estimated \$500 000 damage to the home.<sup>24</sup> The ACCC understands that the house fire in Clarendon Vale, Tasmania destroyed the house. The NSW fire departments have not yet released information regarding the costs of the house fires in New South Wales but one house was destroyed.
- 5.18. Regulators would be unable to identify and negotiate the voluntary recall of unsafe self-balancing scooters without extensive testing of individual products or until after investigating a self-balancing scooter fire or similar incident.
- 5.19. Suppliers of unsafe self-balancing scooters that cannot be sold overseas may decide to sell them in Australia. In this context, the absence of regulation of self-balancing scooters after the interim ban ends may create a significantly more dangerous situation compared to the period prior to the imposition of the interim ban.

### **Cost/Benefit Analysis**

- 5.20. Cost benefit analysis has not been conducted on the no-regulation option. The additional costs and benefits of the options outlined below have been assessed and derived compared to this no regulation option.

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<sup>24</sup> 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>

## Option 2 – Permanent ban on self-balancing scooters that do not meet specific safety requirements

- 5.21. Under section 114 of the ACL, the Commonwealth Minister may impose a permanent ban on consumer goods of a particular kind where an interim ban on those goods is in force. Under this option, a permanent ban would mirror the current interim ban.
- 5.22. Unlike an interim ban that is in force for a specified period, a permanent ban continues in force until the Commonwealth Minister revokes it.
- 5.23. A permanent ban would prevent the supply of self-balancing scooters unless they complied with specific safety requirements as summarised in the table below.

**Table 5.2: Summary of requirements for option 2**

Requirement	UL option	IEC (or AS/NZS) option
Battery	<u>Section 16 of UL 2272</u> Compliance with this section, in effect, requires full compliance with the UL 2580 (battery standard for batteries used in electric vehicles)	Compliance with IEC 62133
Battery control system	Requires compliance with sections 11, 15.1, 15.2, 15.3, 15.4, 15.5, 23, 24, 26 and 27 of UL 2272	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: IEC 60335-1 OR AS/NZS 60335.1

- 5.24. The safety requirements in UL 2272 and the IEC or AS/NZS standards specified in the table above relate to rechargeable lithium-ion batteries and battery control systems and:
- prevent battery overcharging
  - limit battery current flow
  - control battery temperature
  - limit voltage imbalance within the battery pack.
- 5.25. During previous consultation, suppliers have expressed concern about the impact of the term ‘ban’ on consumer and retailer confidence in the safety of the product. Consumers and retailers may not always understand the distinction between a complete ban on all self-balancing scooters and a ban on self-balancing scooters that do not meet specific safety requirements.
- 5.26. Industry profits may fall due to increased regulatory costs, though these additional costs are not estimated to be significant. While the market for self-balancing scooters has slowed due to a natural decline in post-Christmas sale and the perception that self-balancing scooters are unsafe because of the fires and the imposition of an interim ban, consumer confidence may improve if they believe self-balancing scooter safety has improved under regulation.



- 5.27. Suppliers may pass on additional regulatory costs via higher prices, which may reduce consumer demand for self-balancing scooters. However, consumers may be willing to pay higher prices if they are confident they are receiving a safer product.

### **Benefits**

- 5.28. This option would give state and territory electrical safety regulators time to clarify their regulatory reach and to agree on a pathway to the longer term safety of self-balancing scooters and lithium-ion powered products under the electrical safety framework.
- 5.29. The interim ban has now been in place for over 60 days and has given suppliers who wish to do so sufficient time to test their products to the relevant safety standards. Additionally, the ERAC guidance for self-balancing scooters has been available since December 2015. Several Australian suppliers have self-balancing scooters that meet the IEC or AS/NZS standards recommended by ERAC or the requirements of UL 2272 available for retail sale. Others are expected to be in a similar position soon.
- 5.30. Suppliers are still able to supply self-balancing scooters that comply with the requirements in the ban.

### **Limitations**

- 5.31. Suppliers consider that the use of the word ban negatively impacts consumer perception of the safety of all self-balancing scooters. Further, a regulation called a 'ban', which allows products to be sold provided they meet specified requirements, may create confusion amongst retailers and suppliers.
- 5.32. A ban does not address the products that consumers have already purchased. The ACCC will negotiate additional voluntary recalls with individual suppliers where unsafe self-balancing scooters are identified. Where a supplier has had their self-balancing scooter tested and finds that it does not comply, the ACCC expects them to immediately implement a voluntary recall. Where a voluntary recall cannot be negotiated, the Minister may need to consider ordering a compulsory recall; however, this has not occurred to date.
- 5.33. This option targets the requirements for self-balancing scooters that electrical safety regulators have identified as particularly important in reducing the risk of fire, 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 potentially fail and create a safety hazard. For example, a mechanical shock to a self-balancing scooter both during manufacture and in normal use can damage a lithium-ion battery potentially creating a safety hazard later.
- 5.34. It is possible, therefore, that this option would not prevent the supply of all self-balancing scooters that may cause a fire, resulting in a risk of injury. This was also recognised by suppliers during the conference held in relation to the interim ban. The ACCC is continuing to work with other Australian regulators, international regulators and suppliers to identify ways to mitigate these risks in the longer term.
- 5.35. Routine market surveillance by electrical safety regulators (for chargers) and the ACCC and other ACL regulators (for other self-balancing scooter components) is likely to identify non-compliance with regulations. Consumer detriment stemming from the likely increase in pricing due to additional compliance costs.
- 5.36. This could limit the range of products compared to the non-regulated marketplace under option 2.

- 5.37. A reduction in competition in the marketplace due to a potential decrease in the number of suppliers and the increased cost of compliance with the ban's requirements.

### **Cost/Benefit Analysis**

#### **Costs**

- 5.38. Business will face increased costs to source compliant self-balancing scooters, to conduct testing to verify compliance with a permanent ban as well as additional 'back office' tasks associated with compliance. Attachment B sets out the calculation of these costs.
- 5.39. Additional costs for option 2 are estimated to be \$466 000 per annum.
- 5.40. When the total estimated additional costs are divided by the estimated number of self-balancing scooter supplied post regulation, the additional cost per self-balancing scooter is approximately \$15.

#### **Benefits**

- 5.41. In order to accurately estimate benefits, the number of fires prevented (and therefore the number of deaths and injuries and the value of property damage prevented) needs to be estimated. This is not possible. For example, regulation might prevent one, two or no deaths in any given year.
- 5.42. The societal cost of a house fire is derived from the estimation of the risk of death and injury and the value of property loss from a house fire. It is estimated to be \$73 000 per fire (see Attachment B).
- 5.43. If regulation prevented all fires, the dollar value estimate of the benefit of regulation would be approximately \$30 per self-balancing scooter (see Attachment B). However, it is unlikely that regulation will eliminate all risk of fire.
- 5.44. However it is reasonable to assume that, based on the discussion above, regulation that results in safer batteries and improved electrical control systems the number of fires will fall, which represents significant benefits to society.

#### **Net benefit**

- 5.45. In the absence of a reasonable estimate of benefits, a reasonable estimate of net benefit cannot be determined. In these circumstances breakeven analysis provides appropriate guidance on the option with the greatest net benefit.
- 5.46. Breakeven analysis can inform how many fires must be avoided to result in a net benefit
- 5.47. Costs are estimated to be \$466 000 per annum, and the societal cost of house fire, as determined in Attachment B is approximately \$73 000 per fire. If option 2 prevents seven house fires, it results in a net benefit.
- 5.48. Breakeven analysis can also estimate the effectiveness of regulation.
- 5.49. The societal value of removing the risk of all fires is approximately \$30 per unit. Regulation is unlikely to prevent every fire. The additional cost of regulation is approximately \$15 per unit. Option 2 would therefore need to reduce the likelihood of a fire by approximately 50 per cent to break even. If it reduces the risk by more than 50 per cent, there is a net benefit

**Table 5.3: Option 2 Average annual regulatory costs**

Average annual regulatory costs (from business as usual)				
Change in costs (\$)	Business	Community organisations	Individuals	Total change in costs
<b>Total, by sector</b>	\$466 000	\$ 0	\$ 0	\$466 000
<b>Cost offset (\$ million)</b>				
	Business	Community organisations	Individuals	Total, by source
<b>Agency</b>	\$ 0	\$ 0	\$ 0	\$ 0
<b>Are all new costs offset?</b>				
<input type="checkbox"/> Yes, costs are offset <input checked="" type="checkbox"/> No, costs are not offset <input type="checkbox"/> Deregulatory—no offsets required				
<b>Total (Change in costs – Cost offset) (\$ million) = \$466 000</b>				

Note: The Treasury portfolio has not yet established 2016 regulatory offsets. Therefore the RIS does not specify a regulatory offset for this proposal. However, the ACCC is not aware of any reason why the Treasury portfolio will not continue to deliver on its red tape reduction targets this year.

### Option 3 - Mandatory safety standard with the same requirements as the interim ban requirements

- 5.50. 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. A safety standard would prevent the sale of self-balancing scooters in Australia unless they met specific safety requirements.
- 5.51. A mandatory safety standard under this option would specify safety requirements from UL 2272 and the relevant IEC or AS/NZS standards in a similar way to option 2 for a permanent ban as described above. Under this option, the mandatory safety standard would mirror the requirements in the current interim ban. The safety requirements are the same as those described under option 2.

**Table 5.4: Summary of requirements for option 3**

Requirement	UL option	IEC (or AS/NZS) option
Battery	Section 16 of UL 2272 Compliance with this section, in effect, requires full compliance with the UL 2580 (battery standard for batteries used in electric vehicles)	Compliance with IEC 62133
Battery control system	Requires compliance with sections 11, 15.1, 15.2, 15.3, 15.4, 15.5, 23, 24, 26 and 27 of UL 2272	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: IEC 60335-1 OR AS/NZS 60335.1

- 5.52. The safety requirements from UL 2272 and the IEC or AS/NZS standards specified in the table above relate to lithium-ion batteries and battery control systems and:
- prevent battery overcharging
  - limit battery current flow
  - control battery temperature
  - limit voltage imbalance within the battery pack.
- 5.53. Option 3 prescribes identical requirements to those set out in option 2. As described under option 2, industry profits may fall due to increased regulatory costs, though these additional costs under option 3 are not estimated to be significant.
- 5.54. The market for self-balancing scooters has slowed due to a natural decline in post-Christmas sales and the perception that self-balancing scooters are unsafe because of the fires and the interim ban. Consumer confidence may improve if they believe self-balancing scooter safety has improved under a mandatory safety standard.
- 5.55. Under option 3, suppliers may pass on additional regulatory costs via higher prices, which may reduce consumer demand for self-balancing scooters. However, consumers may be willing to pay more if they are confident of a safer product.

#### **Benefits**

- 5.56. The interim ban has been in place for over 90 days and has given suppliers sufficient time to test their products to the relevant safety standards. Several Australian suppliers already meet the requirements of the interim ban. These suppliers will be able to continue to supply self-balancing scooters that comply with the interim ban.
- 5.57. Therefore, a mandatory safety standard developed under option 3 could commence immediately as suppliers of self-balancing scooters have been subject to the testing requirements since at least 18 March 2016 when the interim ban came into force.
- 5.58. This option gives state and territory electrical safety regulators time to develop a national pathway to the longer term safety of self-balancing scooters and lithium-ion powered products under the electrical safety framework.
- 5.59. Suppliers could still supply self-balancing scooters that provide an adequate level of safety.
- 5.60. Although the effect is the same as for a permanent ban on self-balancing scooters that do not meet specific safety standards, a mandatory safety standards facilitates the ongoing supply of safe goods whereas a ban restricts the supply of unsafe goods. A mandatory safety standard could therefore help to restore consumer and retailer confidence in the safety of self-balancing scooters.
- 5.61. A mandatory safety standard would also mean that self-balancing scooter suppliers would need to nominate which method they used to comply with the safety standard, when asked by an ACL regulator such as the ACCC.<sup>25</sup> That is, suppliers would need to nominate either the UL 2272 or the IEC 60335-1 and IEC 62133 (or the equivalent AS/NZS standards) compliance pathways.

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<sup>25</sup> Section 108 of the ACL sets out these requirements for a safety standard.

## **Limitations**

- 5.62. The mandatory standard will not address the products that consumers have already purchased. The ACCC will negotiate additional voluntary recalls with individual suppliers where unsafe self-balancing scooters are identified. Where a supplier has had their self-balancing scooter tested and finds that it does not comply with the interim ban they should immediately recall it. Where a supplier does not commence a voluntary recall, the Minister may need to consider ordering a compulsory recall.
- 5.63. This option targets the features of self-balancing scooters that electrical safety regulators have identified as important in reducing fire risk, based on the evidence of fire 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, a mechanical shock to a self-balancing scooter 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 self-balancing scooter fires to date.
- 5.64. It is therefore possible that this option would not prevent the supply of all potentially hazardous self-balancing scooters that may cause a fire, resulting in a risk of injury. This was also recognised by suppliers during the conference held in relation to the interim ban. The ACCC is continuing to work with other Australian regulators, international regulators and suppliers to identify ways to mitigate these risks in the longer term.
- 5.65. Routine market surveillance by electrical safety regulators (for chargers) and the ACCC and other ACL regulators (for other self-balancing scooter components) is likely to identify non-compliance with regulations.
- 5.66. Consumer detriment stemming from the likely increase in pricing due to additional compliance costs.
- 5.67. Limited selection of products compared to the non-regulated marketplace.
- 5.68. A reduction in competition in the marketplace due to a potential decrease in the number of suppliers and the increased cost of compliance with the mandatory standard's requirements.

## **Cost/Benefit Analysis**

- 5.69. Option 3 would require the same requirements as option 2. Therefore, the costs/benefit analysis is identical. The key difference is that option 2 is a permanent ban and option 3 is a safety standard.

## **Costs**

- 5.70. Business will face increased costs to source compliant self-balancing scooters, to conduct testing to verify compliance with a permanent ban as well as additional 'back office' tasks associated with compliance. Attachment B sets out the calculation of these costs.
- 5.71. Additional costs for option 3 are estimated to be \$466 000 per annum.
- 5.72. When the total estimated additional costs are divided by the estimated number of self-balancing scooter supplied post regulation, the additional cost per self-balancing scooter is approximately \$15.

## **Benefits**

- 5.73. In order to accurately estimate benefits, the number of fires prevented (and therefore the number of deaths and injuries and the value of property damage prevented) needs to be estimated. This is not possible. For example, regulation might prevent one, two or no deaths in any given year.
- 5.74. The societal cost of a house fire is derived from estimates of the risk of death and injury and the value of property loss from a house fire. It is estimated to be \$73 000 per fire (see Attachment B).
- 5.75. If regulation prevented all fires, the dollar value estimate of the benefit of regulation would be approximately \$30 per self-balancing scooter (see Attachment B). However, it is unlikely that regulation will eliminate all risk of fire.
- 5.76. However it is reasonable to assume that, based on the discussion above, regulation that results in safer batteries and improved electrical control systems the number of fires will fall, which represents significant benefits to society.

## **Net benefit**

- 5.77. In the absence of a reasonable estimate of benefits, a reasonable estimate of net benefit cannot be determined. In these circumstances breakeven analysis provides appropriate guidance on the option with the greatest net benefit.
- 5.78. Breakeven analysis can inform how many fires must be avoided to result in a net benefit
- 5.79. Costs are estimated to be \$466 000 per annum, and the societal cost of house fire, as determined in Attachment B is approximately \$73 000 per fire. If option 3 prevents seven house fires, it results in a net benefit.
- 5.80. Breakeven analysis can also estimate the effectiveness of regulation.
- 5.81. The societal value of removing the risk of all fires is approximately \$30 per unit. Regulation is unlikely to prevent every fire. The additional cost of regulation is approximately \$15 per unit. Option 3 would therefore need to reduce the likelihood of a fire by approximately 50 per cent to break even. If it reduces the risk by more than 50 per cent, there is a net benefit.

**Table 5.5: Option 3 Average annual regulatory costs**

Average annual regulatory costs (from business as usual)				
Change in costs (\$)	Business	Community organisations	Individuals	Total change in costs
<b>Total, by sector</b>	\$466 000	\$ 0	\$ 0	\$466 000
<b>Cost offset (\$)</b>				
	Business	Community organisations	Individuals	Total, by source
Agency	\$ 0	\$ 0	\$ 0	\$ 0
<b>Are all new costs offset?</b>				
<input type="checkbox"/> Yes, costs are offset <input checked="" type="checkbox"/> No, costs are not offset <input type="checkbox"/> Deregulatory—no offsets required				
<b>Total (Change in costs – Cost offset) (\$ million) = \$466 000</b>				

Note: The Treasury portfolio has not yet established 2016 regulatory offsets. Therefore the RIS does not specify a regulatory offset for this proposal. However, the ACCC is not aware of any reason why the Treasury portfolio will not continue to deliver on its red tape reduction targets this year.

#### Option 4 - Mandatory safety standard with additional requirements to the interim ban

- 5.82. A safety standard could specify additional requirements to those of the interim ban. These additional requirements would relate to a range of measures including mechanical protection, flammability, preventing ingress of water, labelling and warnings on the product.
- 5.83. At least one stakeholder has expressed a preference to require full compliance with IEC 62133 and full compliance with IEC 60335-1 (not just sections 11 and 19 of IEC 60335-1 set out in the interim ban).
- 5.84. A safety standard under this option could require all of IEC 62133 for batteries and all of IEC 60335-1 **or** all of UL 2272 except section 10 (UL 2272 section 10 conflicts with Australian state and territory electrical safety charger requirements) as summarised in the table below.

**Table 5.6: Summary of requirements for option 4**

Requirement	UL option	IEC (or AS/NZS) option
Battery	All sections of UL 2580 (as required by section 16 of UL 2272)	All sections of IEC 62133
Self-balancing scooter	All sections of UL 2272 (except section 10)	All sections of IEC 60335-1 OR All sections of AS/NZS 60335.1

- 5.85. The regulatory scope of option 4 is broader than options 2 and 3. Therefore, the regulatory costs are greater. Consequently industry profits may fall.

- 5.86. Suppliers may pass on additional regulatory costs via higher prices. If so, prices under option 4 may be higher than prices under options 2 and 3. This may reduce consumer demand for self-balancing scooters. Consumers may be willing to pay higher prices if they are confident they are receiving a safer product. Whether consumers perceive that a self-balancing scooter that meets the more extensive regulatory requirements set out in option 4 will result in a demonstratively safer self-balancing scooter and are therefore willing to pay that higher price is uncertain.
- 5.87. It is possible that the additional regulatory requirements under option 4 may also result in greater benefits. Some electrical safety regulators have stated that they favour this option. New South Wales Fair Trading advised that the additional sections of IEC 60335-1 may be beneficial because they include requirements for:
- mechanical strength
  - preventing the ingress of moisture,
  - resistance to heat and fire
  - mechanical protection of internal wiring
  - marking and instructions.

These requirements may improve self-balancing scooter safety beyond options 2 and 3. However, it is uncertain if they will reduce the risk of self-balancing scooter fires. It is therefore difficult to quantify their benefits, particularly for cost benefit analysis.

#### **Benefits**

- 5.88. This is ESV's preferred option and would largely align Commonwealth intervention with ESV requirements.
- 5.89. Compared to options 2 and 3, this option provides additional requirements and may lead to a safer self-balancing scooter.
- 5.90. Option 4 may simplify compliance. Suppliers would test self-balancing scooters against all sections of UL 2272 (except section 10) or all sections of IEC 60335-1 (not just sections 11 and 19 of IEC 60335-1 as required under options 2 and 3).

#### **Limitations**

- 5.91. A number of suppliers have already undertaken expensive and time-consuming testing of products to ensure compliance with the interim ban requirements. Extending the requirements in the mandatory standard will create additional regulatory burden on these suppliers (as set out in Attachment B) for an uncertain marginal increase in safety.
- 5.92. An increase in regulatory burden may increase self-balancing scooter prices.
- 5.93. Increased regulatory burden may result in suppliers exiting the market reducing the range of self-balancing scooters.
- 5.94. A reduction in competition in the marketplace due to a potential decrease in the number of suppliers and the increased cost of compliance with the mandatory standard's requirements.



## **Cost/Benefit Analysis**

### **Costs**

- 5.95. Business will face increased costs to source compliant self-balancing scooters, to conduct testing to verify compliance with a permanent ban as well as additional 'back office' tasks associated with compliance. These costs are estimated to be higher than under options 2 and 3 because option 4 imposes additional requirements. Attachment B sets out the calculation of these costs.
- 5.96. Additional costs for option 4 are estimated to be \$1.34 million per annum.
- 5.97. When the total estimated additional costs are divided by the estimated number of self-balancing scooters supplied post regulation, the additional cost per self-balancing scooter is approximately \$42.

### **Benefits**

- 5.98. The societal cost of a house fire is estimated to be \$73 000 per fire (see Attachment B).
- 5.99. If regulation prevented all fires, the dollar value estimate of the benefit of regulation would be approximately \$30 per self-balancing scooter (see Attachment B).

### **Net benefit**

- 5.100. In the absence of a reasonable estimate of benefits, a reasonable estimate of net benefit cannot be determined. In these circumstances breakeven analysis provides appropriate guidance on the option with the greatest net benefit.
- 5.101. Breakeven analysis can inform how many fires must be avoided to result in a net benefit
- 5.102. Costs are estimated to be \$1.34 million per annum, and the societal cost of house fire, as determined in Attachment B is approximately \$73 000 per fire. If option 4 prevents 19 house fires, it would result in a net benefit. Under options 2 and 3 a net benefits results after seven house fires.
- 5.103. Breakeven analysis can also estimate the effectiveness of regulation.
- 5.104. The societal value of removing the risk of all fires is approximately \$30 per unit. The additional cost of regulation is approximately \$42 per unit. Option 4 is therefore unlikely to result in a net benefit.

**Table 5.7: Option 4 Average annual regulatory costs**

<b>Average annual regulatory costs (from business as usual)</b>				
<b>Change in costs (\$)</b>	<b>Business</b>	<b>Community organisations</b>	<b>Individuals</b>	<b>Total change in costs</b>
<b>Total, by sector</b>	\$1 340 000	\$ 0	\$ 0	\$1 340 000
<b>Cost offset (\$)</b>				
	<b>Business</b>	<b>Community organisations</b>	<b>Individuals</b>	<b>Total, by source</b>
<b>Agency</b>	\$ 0	\$ 0	\$ 0	\$ 0
<b>Are all new costs offset?</b>				
<input type="checkbox"/> Yes, costs are offset <input checked="" type="checkbox"/> No, costs are not offset <input type="checkbox"/> Deregulatory—no offsets required				
<b>Total (Change in costs – Cost offset) (\$) = \$1 340 000</b>				

Note: The Treasury portfolio has not yet established 2016 regulatory offsets. Therefore the RIS does not specify a regulatory offset for this proposal. However, the ACCC is not aware of any reason why the Treasury portfolio will not continue to deliver on its red tape reduction targets this year.

### Increasing the scope of regulation

- 5.105. The possibility of broadening the scope of regulation was discussed during consultation on the options. It was proposed that the definition of self-balancing scooters be amended to capture single wheeled scooters, which were not captured under the interim ban.
- 5.106. Single wheeled scooters may pose the same potential fire hazard as two-wheeled self-balancing scooters. There has been one reported fire involving a single wheeled scooter in the United Kingdom.
- 5.107. ACCC market research indicates that single wheeled scooters are more expensive than two wheeled self-balancing scooters and appear to be of a higher quality. Apart from the one fire reported in the United Kingdom, the ACCC is not aware of any fire incidents involving single wheeled scooters and therefore there does not appear to be sufficient evidence to support regulation of single wheeled scooters in Australia at this time.

### Compliance, enforcement and penalties

- 5.108. Compliance costs for suppliers are the same for Option 2 and 3. However, Option 4 will cost more for suppliers to comply with, both initially and on an ongoing basis.
- 5.109. The penalties for non-compliance with a mandatory standard and ban are the same for suppliers across all options. Failure to comply with a permanent ban or safety standard is an offence under the ACL with fines, of up to \$1.1 million in the case of a corporation, and \$220 000 in the case of an individual. The size of the penalty is determined by the court after taking all factors into consideration.

## Recommended option

- 5.110. As set out in the Australian Government Guide to Regulation, regulators must recommend the option with the greatest net benefit.
- 5.111. Option 1 is not recommended due to the ongoing fire hazard posed by the self-balancing scooters. There is a risk of death or serious injury from fires caused by self-balancing scooters that do not meet specific safety requirements.
- 5.112. Option 2 is not recommended. Option 2 is likely to reduce house fires and is likely to create a net benefit (the breakeven analysis supports this position). However, suppliers are concerned about the impact of the term '*ban*' on consumer and retailer confidence in the safety of the product. Consumers and retailers may not always understand the distinction between a complete ban on all self-balancing scooters and a ban on self-balancing scooters that do not meet specific safety requirements.
- 5.113. Option 3 is **recommended**. A mandatory safety standard put in place for two-years is likely to reduce the risk of house fires, similar to option 2, without the concerns raised by suppliers about retailer and consumer confusion and consumer lack of confidence. Since the options being considered are in the context of a two-year time frame this option provides the highest net benefit and also allows the electrical regulators time to align their legislation and regulations to promote the supply of safe self-balancing scooters.
- 5.114. Option 4 is not recommended. A mandatory safety standard based on option 4 is likely to reduce the risk of house fires and address concerns around retailer and consumer confidence in self-balancing scooters. At least one electrical safety regulator would like to see all the requirements of IEC 60335-1 apply. However, in the absence of any compelling evidence that the additional requirements under option 4 would reduce house fires, the additional measures would raise the net costs without an equal, or greater, increase in net benefits. Therefore the net benefit of option 4 is less than the net benefits of options 2 and 3.
- 5.115. The ACCC does not recommend that the scope of regulation be broadened to capture single wheeled scooters.

## 6. Implementation and evaluation

- 6.1. The ACCC will continue to support suppliers with their self-balancing scooter recalls. The ACCC will also support retailers by continuing to provide information regarding the expectations and requirements for self-balancing scooters. The ACCC has a number of tools for engaging with suppliers including the ACCC website, the Product Safety Australia website, a call centre for information and ongoing engagement of safety messaging over social media.
- 6.2. If option 3 is accepted and a mandatory safety standard is made, it will automatically expire two years after it commences.

## 7. Consultation

### Pre-interim ban consultation

- 7.1. In mid-March 2016, the ACCC contacted all known self-balancing scooter suppliers and advised them that the ACCC was considering options to reduce the risk of house fires caused by self-balancing scooters and that one of the options under consideration was an interim ban on self-balancing scooters 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 may be imposed without delay.

- 7.2. The ACCC invited suppliers to make submissions about the options being considered and contacted them by phone and email. The ACCC received thirty-two submissions.
- 7.3. A number of submissions suggested that self-balancing scooters 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, the interim ban was drafted to include the IEC standards in addition to the requirements in UL 2272.

### **Post-interim ban consultation**

- 7.4. The ACCC continued to consult with stakeholders following the interim ban. Some suppliers have provided copies of test certificates to the ACCC, requesting confirmation that they have met the requirements of the interim ban.

### **Supplier conference**

- 7.5. The post-ban conference provided affected suppliers with an opportunity to discuss the interim ban and the way it affects them. The information gathered at the conference assisted in forming the ACCC's recommendation to the Minister on whether the interim ban should be remain in force, be, varied or be revoked.
- 7.6. Suppliers raised the following issues at the conference, and in written submissions provided to the ACCC before the conference:

#### **Issue 1: The availability and cost of testing for compliance with specified safety requirements**

There was concern expressed that test laboratories could not or would not test self-balancing scooters to the Underwriters Laboratories UL 2272 standard.

There were also indications that testing to the sections of the IEC standard 60335-1 referenced in the interim ban would be costly and time-consuming.

A number of suppliers indicated that they had taken, or were taking, steps to obtain confirmation that their products met the requirements of either the specified parts of the relevant IEC standards (or mirror Australian or New Zealand standards) or UL 2272, as specified in the interim ban.

#### **ACCC response to suppliers**

The ACCC identified test laboratories that are able to test self-balancing scooters against the requirements in both the IEC and UL standards referenced in the interim ban at significantly cheaper prices than those quoted by some suppliers at the conference. The ACCC directed suppliers to test laboratories that can test to either or both standards referenced in the interim ban.

#### **Issue 2: Concerns regarding consumer perception of the safety of self-balancing scooters as a result of the interim ban**

A number of suppliers stated that the interim ban had damaged consumer confidence in the safety of self-balancing scooters. It was reported that many retailers are or would be reluctant to stock self-balancing scooters as they are now considered a 'tainted' product.

### **ACCC response to suppliers**

The ACCC acknowledged these concerns. Media coverage, prior to the ban, of homes destroyed as a result of self-balancing scooter fires, is also likely to have had a substantial impact on consumer perception. The impact of a ban has been included in the RIS consultation process and in the assessment of the regulatory options.

### **Issue 3: Concerns that the interim ban may be difficult to enforce against online suppliers based overseas**

Conference attendees were concerned that the fires and other incidents in Australia may have involved self-balancing scooters supplied by online suppliers based overseas, and that the interim ban may be more difficult to enforce against these suppliers.

### **ACCC response to suppliers**

The ACCC acknowledged some practical challenges in enforcing the law against suppliers based overseas, and confirmed that it includes online suppliers (based both locally and overseas) in its consumer product safety surveillance activities. The ACCC is also working with online platforms including eBay to restrict the online sale of banned goods to Australian consumers.

## **Regulation impact statement consultation process**

- 7.7. The ACCC sent a consultation paper to all known self-balancing scooter suppliers, electrical regulators and newly identified suppliers of one-wheeled self-balancing devices on 17 May 2016. The paper set out the options identified above, proposed expanding the definition of self-balancing scooters to better align with recognised safety standards and proposed expanding the scope of any regulation to capture one-wheeled self-balancing devices. The consultation period ended on 31 May 2016.
- 7.8. Stakeholders were asked to:
- nominate a preferred option and explain why it was preferred
  - identify any other viable options
  - identify any additional costs they would incur for each option
  - comment on the proposed amended definition for self-balancing scooters and the proposed expanded scope to capture single wheeled devices.
- 7.9. Fourteen submissions were received, 11 from self-balancing scooter suppliers, two from Choice and Kidsafe and one from the Australian Toy Association.
- 7.10. **Option 2:** There were no respondents who supported this option.
- 7.11. **Option 3:** Six respondents supported option 3.
- 7.12. Comments included:
- Option 2 focuses on the immediate and most serious hazard posed by the product.
  - Shifting from a 'ban' to a 'safety standard' would partly restore consumer confidence in the self-balancing scooters

- Suppliers have already spent time and money complying with the interim ban and compliance with a safety standard developed under option 3 would have little additional impact.
- Option 3 may be an appropriate medium term option until a voluntary Australian/New Zealand standard is fully developed.

7.13. **Option 4:** Five respondents supported option 4.

7.14. Comments included:

- Some suppliers stated that the factories they were dealing with would be able to supply self-balancing scooters at a minimal cost increase since they would be producing compliant product for other international markets.
- Consumer confidence would be increased due to full compliance with IEC requirements.
- Option 4 maximises the electrical, mechanical and physical safety offered to customers through the tightest testing regime.
- A number of suppliers noted that option 4 would add \$40 000 to \$50 000 to compliance costs and would take 3-6 months to develop compliant product.

#### **Amending Hoverboard Definition**

7.15. The majority of respondents supported the change in the description of the product from 'hoverboards' to 'self-balancing scooters' and also supported amending the definition.

7.16. Many of the existing two-wheeled hoverboard suppliers wanted to broaden the scope of the regulation to include single-wheeled self-balancing scooters.

7.17. Single-wheeled self-balancing scooters suppliers did not believe that broadening the scope was justified. Respondents argued that there was no evidence that single-wheeled self-balancing scooters were dangerous. One respondent stated that the higher cost of unicycles reflected the use of battery moderator systems which regulate current and prevent over charging and that these features reduce the risk of fire. Two respondents argued that the ACCC should consider a broader product definition and focus on lithium-ion batteries, their capacities and connection to mains power supply. The ACCC is having several single wheeled self-balancing scooters tested and will continue to monitor their safety.

7.18. Attachment C provides a summary of stakeholder comments.

## Attachment A: International regulatory responses for unsafe self-balancing scooters

**Table A1: Summary of international regulatory responses for unsafe self-balancing scooters**

Country	Issue	Response	Incidents
<b>Israel</b>	Self-balancing scooters	Prohibited import.	n/a
<b>Jamaica</b>	User restriction	Use on roads would violate the Jamaica Road Traffic Act	
<b>Japan</b>	n/a	Not available for sale in Japan	
<b>Philippines</b>	Warning labels	<p>Philippines Department of Trade and Industry's Fair Trade Enforcement Bureau has issued notices of violation over the selling of self-balancing scooters with incomplete or without proper warning labels.</p> <p>The Department of Trade and Industry (DTI) together with the Department of Health and the Food and Drug Administration issued two Health Advisory notices on Hoverboard Safety Concerns advising the public to be vigilant and to observe precautionary measures. The notices also warned distributors, retailers and importers about the required safety labelling.</p>	
<b>Canada</b>	<p>Non-compliant battery chargers</p> <p>English only instructions</p>	02/02/2016 - Health Canada issued a recall of the Smart Wheel Balance model distributed by Eco Chic Distribution Inc. These products were sold with battery chargers that did not have the necessary electrical certification to be sold in Canada. In addition, the	No incidents related to recalled device

Country	Issue	Response	Incidents
		affected units were sold with English-only instruction manuals.	
<b>New Zealand</b>	Non-compliant battery chargers	<p>Two fines issued for supply of non-compliant electrical articles</p> <p>Inclusion of self-balancing scooters in medium – risk electrical article category with effect from 16 February 2016. (Previously low-risk).</p> <p>This ensures that suppliers will have to have the safety of the self-balancing scooters and their chargers certified.</p> <p>Energy Safety NZ will now be auditing suppliers and requesting:</p> <ul style="list-style-type: none"> <li>• Supplier declarations of conformity for both items</li> <li>• Test reports on electrical safety of the device</li> <li>• Test report for the charger, also demonstrating that the charger is safe to use with the device (<a href="http://www.trademe.co.nz/trust-safety/2016/2/2/electric-hoverboard-scooters/">http://www.trademe.co.nz/trust-safety/2016/2/2/electric-hoverboard-scooters/</a>)</li> </ul>	
<b>Qatar</b>	Sale	Qatar Consumer Protection Department at the Ministry of Economy and Commerce has issued a notice to stores to stop selling self-balancing scooters.	
<b>Singapore</b>	Use	July 2015, the country’s Land Transport Authority instructed an advisory panel to come up with rules for the safe use of personal mobility devices including self-balancing scooters and electric scooters. Among other things, the panel is studying whether the devices should be allowed on public roads, and if so, on which lanes they should be used. A set of rules is expected	



Country	Issue	Response	Incidents
in the first half of 2016.			
<b>UAE</b>	User safety	Use is banned in malls.	Three deaths
<b>United Kingdom</b>	Non-compliant electrical chargers	<p>Examination and seizure of self-balancing scooters by National Trading Standards. (Of 18,000 examined 15,000 or 83 % non-compliant.)</p> <p>Four voluntary recalls in December 2015, and one voluntary recall in February 2016.</p> <p>In December 2015 the UK Department of Transport published an information sheet providing guidance on the use of powered transporters which includes a variety of novel personal transport devices - including Segway, Swegways, Self-balancing scooters, U-wheels, powered mini scooters (go-peds) and powered unicycles.</p> <p>The Crown Prosecution Service and the Metropolitan police confirmed that using a self-balancing mini scooter (hoverboard) is illegal on the road as well as on a public pavement or footpath in Britain.</p> <p>See UK Standards Authorities report in Appendix C.</p> <p>UK recalls include:</p> <ul style="list-style-type: none"> <li>• Mitsuta All Smart Gizmos DuoGlyde Self Balancing Drifter/Hoverboard and GT Self-balancing scooter, Charger: HK-42-2000</li> <li>• John Lewis Selfy Stick Air Runner (white and black) 893 91901 &amp; 893 91902</li> <li>• Menkind and Red5 Flywheels in black, white and</li> </ul>	<p>One death</p> <p>Fire in Morden and Southwark (electric unicycle)</p> <p><a href="http://www.wired.co.uk/news/archive/2015-10/21/self-balancing-scooters-catching-fire">http://www.wired.co.uk/news/archive/2015-10/21/self-balancing-scooters-catching-fire</a></p> <p>20/01/2016 house fire in Wyke, Bradford, West Yorkshire three children at home</p> <p><a href="http://www.examiner.co.uk/news/west-yorkshire-news/first-hoverboard-fire-recorded-west-10761354">http://www.examiner.co.uk/news/west-yorkshire-news/first-hoverboard-fire-recorded-west-10761354</a></p> <p><a href="http://www.dailymail.co.uk/news/article-3405267/Exploding-hoverboard-nearly-killed-three-children-set-fire-house-charged.html">http://www.dailymail.co.uk/news/article-3405267/Exploding-hoverboard-nearly-killed-three-children-set-fire-house-charged.html</a></p> <p>26/01/2016 Fire in East Belfast</p> <p><a href="http://www.belfasttelegraph.co.uk/news/northern-ireland/hoverboard-fire-east-belfast-house-on-ardgowan-street-destroyed-34399284.html">http://www.belfasttelegraph.co.uk/news/northern-ireland/hoverboard-fire-east-belfast-house-on-ardgowan-street-destroyed-34399284.html</a></p> <p>Fire in High Wycombe with reported consumer injuries from burns.</p> <p>Fire in Kent causing extensive damage to a kitchen</p> <p><a href="http://www.buzzfeed.com/patricksmith/those-hoverboard-things-that-kids-ride-around-on-">http://www.buzzfeed.com/patricksmith/those-hoverboard-things-that-kids-ride-around-on-</a></p>

Country	Issue	Response	Incidents
		<p>red. Codes 51974, 51976, 51977 and SmartGlider in "cool white", "Dazzling red" and "jet black". Codes: 51979, 51980, 51978</p> <ul style="list-style-type: none"> <li>Argos Nevaboard - catalogue code: 455/7669</li> <li>Tesco iCandy airboard glider - all models</li> <li>Halfords Air Runner Balance Board, 190375 192470, 192488</li> <li>Swegway "double intelligent drift scooter" Chinese imports from the internet which contains a 'Use's' Manual with counterfeit CE safety markings and written instructions expressed in very poor English.</li> </ul> <p>(<a href="http://www.cornwall.gov.uk/council-and-democracy/council-news-room/media-releases/news-from-2016/news-from-january-2016/hoverboard-safety-recalls-continue-due-to-fears-over-potential-fires-and-explosions/">http://www.cornwall.gov.uk/council-and-democracy/council-news-room/media-releases/news-from-2016/news-from-january-2016/hoverboard-safety-recalls-continue-due-to-fears-over-potential-fires-and-explosions/</a>)</p>	<p><a href="#">keep-explod#.xyAg1A4J7</a></p> <p>Fire in child's bedroom in Cornwall after an hour on charge</p> <p><a href="https://www.cornwall.gov.uk/council-and-democracy/council-news-room/media-releases/news-from-2016/news-from-january-2016/hoverboard-safety-recalls-continue-due-to-fears-over-potential-fires-and-explosions/">https://www.cornwall.gov.uk/council-and-democracy/council-news-room/media-releases/news-from-2016/news-from-january-2016/hoverboard-safety-recalls-continue-due-to-fears-over-potential-fires-and-explosions/</a></p> <p>26/02/2016 Heathrow</p> <p>Fires reported as a consignment of self-balancing scooters seized at UK border and destroyed.</p> <p><a href="http://www.dailymail.co.uk/news/article-3464149/Mountain-illegal-hoverboards-erupts-flames-seized-Heathrow-destroyed-sending-Trading-Standards-officers-running-cover.html">http://www.dailymail.co.uk/news/article-3464149/Mountain-illegal-hoverboards-erupts-flames-seized-Heathrow-destroyed-sending-Trading-Standards-officers-running-cover.html</a></p>
<b>USA</b>	<p>Battery failures</p> <p>52 fires in more than 24 states</p>	<p>Post fire examination of 3 devices and testing of 20 devices purchased new raised safety concerns:</p> <p>While conclusions are preliminary, investigators determined that the fire incidents are related to the design and components of the hoverboard device rather than the battery chargers supplied with them. Examination of purchased products indicated the presence of serious safety and design flaws. In combination these are expected to present serious fire risks, and if devices fail, potentially associated operating risks.</p>	<p>c.42 fires</p> <p>28/12/2016 - More than 70 reports of consumer injuries from falls:</p> <p>Broken wrists</p> <p>One trapped finger, one crushed finger.</p> <p>Subdural haematoma</p> <p>Concussions</p> <p>Contusions</p>

Country	Issue	Response	Incidents
		<p>US Investigators observed that the devices present extremely high variability, rendering market-based visual surveillance very challenging. In particular:</p> <ul style="list-style-type: none"> <li>• hoverboard packaging did not represent the contents, and many difference devices were found within otherwise identical cartons</li> <li>• content within the hoverboard exterior casing was also highly variable.</li> </ul> <p>Despite the variability, US investigators have identified three key issues held in common by all the tested devices and which diverge from best practice safe design, regarding voltage, current and temperature controls, for products powered by rechargeable lithium batteries:</p> <ul style="list-style-type: none"> <li>• an absence of temperature control such as a thermistor, noting that circuitry boards contained pins for the potential addition of a thermistor, however none had been soldered on.</li> <li>• an absence of current control within the devices at the systems level, i.e. no current control between the battery pack, motherboard and motors; and</li> <li>• an absence of ‘overcurrent’ protection devices.</li> </ul> <p>U.S. investigators advised that all the devices tested or examined post-incident were powered by 20-cell Lithium-ion battery packs in a 2P10S configuration, however they identified 16 different combinations of battery (cell) types and internal configurations.</p>	<p>Abrasions</p> <p>One smoke inhalation injury.</p>

Country	Issue	Response	Incidents
		<p>Investigators have also looked at battery chargers supplied with the products and have concluded that they are compliant with US requirements.</p> <p>Preliminary conclusions drawn by the U.S. CPSC are that the most likely root-cause for the fire incidents is the lithium-ion battery, and circuitry, however that there are numerous contributing factors.</p> <p>On 20 February 2016 the USCPSC issued correspondence to all suppliers of self-balancing scooters advising that devices should comply with voluntary safety standards contained in UL-2272 – Outline of Investigations for Electrical Systems for Self-balancing scooters. Additionally, all 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.</p> <p>No product recalls. However, online seller, Amazon has offered American consumers who purchased a hoverboard from or via Amazon, a full refund if they returned the product.</p>	

## Attachment B: Estimated costs and benefits of each regulatory option

*The Australian Government Guide to Regulation* requires the identification and quantification of the costs and benefits of each regulatory option. The purpose of this attachment is to estimate those costs and benefits.

Costs are comprised of substantive compliance costs (additional costs to have self-balancing scooters manufactured to meet regulation and periodic product testing to ensure manufactured products meet regulations) and administrative costs ('back office' administrative tasks to track compliance with regulation). The default duration for cost estimation is 10 years. However the regulatory options outlined would be in place for a period of two years.

Benefits are comprised of the reduction in the risk of house fires that potentially result in:

- the loss of life
- burn injury to occupants
- destruction or damage to the house
- destruction and damage to the house contents.

As at the publication of this RIS there has been no loss of life or significant injury as a result of the six house fires started by self-balancing scooters. However, if action is not taken to reduce the risk of fire, it is reasonable to assume that death and /or serious injury from burns will occur. Accordingly, in addition to costing property damage, costs for death and injury have been estimated also.

Costs and benefits estimated below have been used to derive an estimate of the net benefit for each option.

### **Cost estimation**

#### **Decline in the number of self-balancing scooters**

In the period between Christmas 2015 and the imposition of the interim ban, importation of self-balancing scooters declined sharply. This decline is likely to have been a combination of a natural post-Christmas decline in self-balancing scooter sales, the impact of ongoing media reports both in Australia and overseas of fires caused by self-balancing scooters and the impact of the interim ban. This decline in the market has been taken into account when estimating costs and benefits.

The ACCC estimates that, going forward there will be just over 50 different models of self-balancing scooter being supplied by approximately 3 times that number of resellers. In short the same model of self-balancing scooter is generally sold by more than one (in some cases, many) different suppliers. A summary of these estimates is included in Table B.1

**Table B.1: Estimated number of self-balancing scooter models and suppliers**

	Number
Discrete self-balancing scooter models	53
Suppliers reselling self-balancing scooter models	159

## Substantive costs

### Additional costs to manufacture compliant self-balancing

Self-balancing scooter suppliers have indicated that the additional cost of manufacturing a self-balancing scooter to meet the requirement of options 2, 3 or 4 are likely to be very low and possibly zero because the cost of additional components is very small. Advice from one supplier estimated the additional cost to be as little as USD 1 per scooter.

The market for self-balancing scooters was declining when the interim ban was imposed. It is estimated that the market will follow a general decline until October each year when it will improve pre-Christmas. Post-Christmas it is expected to again decline. Based on these assumptions, it is estimated that approximately 32 000 self-balancing scooters will be imported into Australian each year.

### Testing self-balancing scooters

If the supply of self-balancing scooters is regulated under one of the options described above, suppliers will include in their manufacturing contracts a requirement that self-balancing scooters must be manufactured to meet either relevant IEC standards (or the equivalent AS/NZS standard) or the relevant UL standard. In submissions to the ACCC, stakeholders have advised that including these requirements will result in either a very small increase in manufacturing costs or no increase at all. On that basis, additional manufacturing costs arising from regulation have not been estimated.

Suppliers have advised that it would be prudent for them to conduct some self-balancing scooter testing to check that finished self-balancing scooters do, in fact, meet any regulations. This will result in additional costs for manufacturers. The ACCC has obtained cost estimates for testing to parts of the IEC standards and the UL 2272 standard as summarised below in Table B.2. Actual test costs may vary depending on contractual arrangements between suppliers and test laboratories and the country where testing is conducted.

**Table B.2: Estimates for testing self-balancing scooters**

Standard	Applicable options	Cost (AUD)
IEC 62133 – All sections and IEC 60335-1 – Sections 11 and 19	Options 2 and 3	5 190
UL 2272 – Sections 11, 15.1 to 15.5, 23, 24, 26, 27	Options 2 and 3	3 400
IEC 62133 – All sections and IEC 60335-1 – All sections	Option 4	7 550
UL 2272 – All sections except section 10 (for chargers)	Option 4	27 260

The regulatory options all provide suppliers with a choice of compliance with either IEC standards or the UL 2272 standard. Accordingly, self-balancing scooters supplied into Australia may meet either compliance pathway.

Under options 2 and 3, additional costs for testing have been based on half the market sourcing IEC standards compliant self-balancing scooters and the other half sourcing UL 2272 compliant self-balancing scooters.

Under option 4, testing to UL 2272 is significantly more expensive than testing to the IEC standards. Accordingly, it has been estimated that 30 per cent of supply will opt for compliance via UL 2272 and 70 per cent will comply with IEC standards.

## Administrative costs

### Additional ‘back office’ tasks resulting from additional regulation

Regulation is likely to add additional costs for business. Costs are derived by multiplying estimates of how long additional tasks will take by an appropriate hourly rate.

The tasks which create additional administrative costs are:

- developing manufacturing specifications to ensure sourcing compliant self-balancing scooters – this includes maintaining an understanding of relevant manufacturing standards - 1 hour
- managing third party compliance testing – negotiating contracts for testing with an accredited test laboratory, organising batch samples for testing, reviewing test results. Estimated time per test – 30 minutes
- record keeping – Maintaining internal records of compliance with regulation. Estimated time per test – 15 minutes
- internal reporting – Reporting to management on levels of compliance. Estimated time per test – 5 minutes.

The estimates above have been rounded to 2 hours to complete back office tasks per round of self-balancing scooter testing.

## Business compliance staff hourly rate

The estimated hourly rate for compliance staff is set out in Table B.3. The rate and scaling factor of 1.75 takes account of wages, non-wage labour costs and overheads. It is based on figures provided by OBPR.<sup>26</sup>

**Table B.3: Compliance officer hourly rate**

Labour cost	Rate
Labour hourly rate	\$37.40
Hourly rate multiplier to account for non-wage labour and overheads	1.75
<b>Gross labour hourly rate</b>	<b>\$65.45</b>

## The total cost for each option

The total estimated additional cost for each option is set out in Table B.4. The total cost has been derived by calculating the additional costs for:

- manufacturing compliant self-balancing scooters
- conducting testing to ensure self-balancing scooters meet specified manufacturing specifications
- administrative costs.

Table B4 shows the estimated additional cost of each self-balancing scooter for each option.

**Table B.4: Estimated additional cost for each regulatory option**

Option	Total additional cost per annum	Additional cost per self-balancing scooter
Option 2	\$466 000	\$15
Option 3	\$466 000	\$15
Option 4	\$1 340 000	\$42

## Estimation of benefits

### Reduction in the number of fires

The most recent fire occurred on 20 April 2016. In the six-month period prior to this date six house fires have been started by self-balancing scooters. In the absence of ongoing regulation and if there were a similar number of sales each year, it would be reasonable to assume that the rate of future fires would be similar to this rate. However, consumers will be aware of the fire risks for self-balancing scooters and it would be reasonable to assume that sales would fall.

<sup>26</sup> Department of Prime Minister and Cabinet, Office of Best Practice Regulation, *Regulatory Burden Measurement Framework Guidance Note*, February 2016, p.18, available: [https://www.dpmc.gov.au/sites/default/files/publications/reg-burden\\_measure-framework.pdf](https://www.dpmc.gov.au/sites/default/files/publications/reg-burden_measure-framework.pdf)



## Statistics from NSW Fire and Rescue

### Deaths

The NSW Fire and Rescue website provides statistics for house fires in NSW. For the five-year period from 2002/03 to 2006/07 there was an average of 4 495 house fires. Over the same period there were 27 deaths per annum and 698 injuries.<sup>27</sup> On this basis, it is assumed that there will be one death for every 166 house fires.

### Injuries

During the same five-year period there was an annual average of 698 injuries attributed to house fires in NSW.<sup>28</sup> On this basis, it is assumed that there will be one injury per six house fires.

### Property damage

Statistics provided by NSW Fire and Rescue for the 2006/07 year indicate that the average dollar loss per residential fire was \$26 784.<sup>29</sup> This figure includes fire damage to the building and contents. Escalated to 2016 dollars the property damage from house fire becomes \$32 700 per house fire.

- It is likely these average statistics underestimate the risk of death and injury and the cost of property damage due to self-balancing scooter fires because:
- self-balancing scooters are likely to be unattended while being charged, so if a fire starts it is likely to accelerate more rapidly than the average house fire
- when self-balancing scooters initially catch fire the battery pack can explode spreading burning material across the room accelerating the spread of fire more rapidly than the average house fire
- three of the six house fires started by self-balancing scooters to date resulted in destruction of the house.

These circumstances indicate that the risk may be higher than for an average house fire.

However, in the interests of providing a conservative estimate of the risk of death, injury and property damage for the purpose of conducting cost benefit analysis, the statistics calculated using the data from the NSW Fire and Rescue website have been used.

### **Loss of life in a house fire**

The OBPR has published guidance on how agencies preparing cost/benefit analysis for a RIS should treat the benefits of regulations designed to reduce the risk of physical harm. The OBPR advises that based on empirical evidence, an estimate of \$4.2 million (2014) for the value of a statistical life is used.<sup>30</sup> Escalated to 2016 dollars, this figure becomes \$4.3 million.

As noted above, it is estimated there will be one death for every 166 house fires.

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<sup>27</sup> NSW Fire and Rescue, Annual Statistic Reports for 2002/03 to 2006/07, available online: <http://www.fire.nsw.gov.au/page.php?id=171>

<sup>28</sup> NSW Fire and Rescue, Annual Statistic Reports for 2002/03 to 2006/07, available online: <http://www.fire.nsw.gov.au/page.php?id=171>

<sup>29</sup> NSW Fire and Rescue, Annual Statistic Reports for 2006/07, available online: <http://www.fire.nsw.gov.au/page.php?id=171>

<sup>30</sup> Department of Prime Minister and Cabinet, Office of Best Practice Regulation Best Practice Regulation Guidance Note Value of statistical life, December 2014, Viewed 19 May 2016, available: [https://www.dpmc.gov.au/sites/default/files/publications/Value\\_of\\_Statistical\\_Life\\_guidance\\_note.pdf](https://www.dpmc.gov.au/sites/default/files/publications/Value_of_Statistical_Life_guidance_note.pdf)

## Burns to house occupants

The cost of burn injury is very difficult to estimate.<sup>31</sup> In addition to the initial cost of treatment in a medical facility, burns patients face time lost from work, family and friends and lost opportunities in other areas of their lives. While the total true cost of burns may be impossible to determine and quantify, the financial burden of the treatment of burns injuries can be assessed and used to estimate the possible cost of burns treatment following a house fire.

Ahn and Maitz (2012) conducted a retrospective review of 20 adult burn patients who were treated in 2008. The total costs varied considerably, highlighting the difficulty in estimating future hypothetical costs. The costs assessed related to burns ranging from 1.5 per cent total burn surface area (TBSA) to 62 per cent TBSA. Treatment cost ranged from \$13 000 to \$467 000. The average treatment cost for this study was \$71 056.

This figure is based on the average of actual initial treatment costs for a range of burns cases. It does not capture the total true cost of burns injury. This figure is very difficult to estimate and depends on a range of factors such as the location on the body of the burn, the severity of the burn and the age of the patient.

The amount of \$71 056 has been escalated to 2016 dollars arriving at the estimated cost of the treatment of burns to be \$85 000.

As noted above, it is estimated that there will be one injury for every six house fires.

### The societal cost of house fires

The societal cost of house fires has been estimated using the figures for:

- rate of death and the statistical value of life
- rate of injury and the estimated cost of treatment
- the value of property damage.

**Table B.5: Societal cost of house fire**

Event	Cost
Death	\$25 976
Injury	\$14 090
Property damage	\$32 713
<b>Total</b>	<b>\$72 776</b>

### The risk of house fire

Under the status quo it is estimated that there will be 12 house fires per year (based on 6 fires in six months) and there had been approximately 100 000 self-balancing scooters imported into Australia. Based on these figures, the risk of a fire in a self-balancing scooter before any regulation (i.e. under the status quo) was 0.00012 (0.012 per cent).

Applying this (per unit) risk of fire to the societal cost of house fire (as set out in Table B.5), means the dollar value of risk to society, per self-balancing scooter, is approximately \$9 per annum.

<sup>31</sup> Ahn, C.S., and Maitz, P. K.M., 2012 *The True Cost of Burn*, Burns; 38, pp – 967-974.

Assuming a product life of, on average 4 years, the net present value of the risk to society per self-balancing scooter, over its life is approximately \$30 (using the OBPR recommended discount rate of 7 per cent).

So if all self-balancing scooter fires could be prevented, and the risk of death, injury and property damage was eliminated, the value to society would be approximately \$30 per self-balancing scooter.

### **Estimating a net benefit**

If the additional cost, per self-balancing scooter, of a regulatory option is less than approximately \$30, there may be a net benefit from regulation (though the net benefit will ultimately depend on the number of fires prevented).

## Attachment C: Summary of stakeholder responses

Respondent	Summary of Stakeholder Response
Respondent 1	The respondent preferred option 3 where existing requirements for self-balancing scooter safety would be made mandatory on an ongoing basis. This should curb the supply of unsafe products and provide some comfort to end users that the products being offered in Australian markets are now safe to use.
Respondent 2	Option 4 was preferred because the suppliers products has been tested to all sections of UL 2272 and meets the standard in full. The cost of testing can be significant, however where an Australian supplier chooses a product that is distributed globally, (specifically into the USA) there may be no additional cost to the Australian supplier.
Respondent 3	Option 3 was preferred because it gives clear guidance on the requirements for safe self-balancing scooters and the cost of compliance is known by many suppliers.
Respondent 4	The respondent prefers option 4 because the self-balancing scooters it supplies are compliant with the IEC standards. Option 4 should ensure safe distribution of hoverboards into the market place. However this option will create additional costs largely through testing as we already manufacture to a compliant standard.
Respondent 5	The respondent prefers option 3. Regulating via a safety standard rather than a ban will go a long way in bringing back consumer confidence. The respondent has invested significantly in order to ensure products comply with the requirements of the interim ban. Total expenses exceed \$150 000. Changing the compliance standards for a product that is already designed, manufactured and compliant is neither feasible nor acceptable.
Respondent 6	The respondent supported the development of an Australian/New Zealand standard that was aligned with international standards. It noted that The most difficult thing in the past is that Australia seems to know better than other countries and sets if own standards which makes it very difficult to comply with as our small production runs do not allow us to change specifications in many instances. Significant additional costs would not make it viable to sell many of these products.
Respondent 7	The respondent stated that regulation via a ban had already confused many buyers who think that a ban means no products can be sold. Therefore Options 3 or 4 were preferred. The cost to meet AS/NZS 60335.1 with SGS Australia is roughly \$10 000.
Respondent 8	The respondent did not support extending the scope of regulation to capture single-wheeled devices because there is no evidence that they pose a danger to consumers. The single wheeled devices are fitted with a battery moderator system that regulates current and prevents over-charging.
Respondent 9	Option 4 was preferred because it appeared to include the best range of provisions to prevent child injury.
Respondent 10	Option 3 was supported. Amending the scope of regulation to capture single-wheeled devices was also supported.
Respondent 11	Regulation via a safety standard under option 3 was preferred. Regulation via a permanent ban creates a negative perception.

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Respondent 12	Option 3 was supported for the short term. In the long term, development of an Australian/New Zealand standard for self-balancing scooters should be adopted.
Respondent 13	Option 4 maximises the electrical, mechanical and physical safety offered to customers through the tightest testing regime.
Respondent 14	It was noted that the interim ban had created losses for the business and it did not support broadening the scope of regulation to capture single-wheeled devices.

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