



Australian Government Department of the Environment

Hazardous Waste Bans, Conditional Disposal Restrictions & Product Stewardship.

A submission to The Department of the Environment and Energy

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Executive Summary

MRA has been commissioned by the Department of the Environment and Energy to document the current status of landfill bans and conditional disposal restrictions for hazardous waste in Australia. The specific aims of this study were to:

- 1. Document the current situation in Australia regarding landfill bans and conditional disposal restrictions that apply to different types of hazardous wastes.
- 2. Describe and analyse the current status of landfill bans and conditional disposal restrictions pertaining to hazardous wastes across the Australian jurisdictions.
- 3. List hazardous waste types banned from landfill disposal, by jurisdiction.
- 4. Describe the current state of hazardous waste related landfill bans and conditional disposal restrictions at national and state/territory scales.
- 5. Address how landfill bans and conditional disposal restrictions could be developed and implemented in concert with product stewardship schemes.
- 6. Suggest a 'model approach' to ban/disposal restriction and product stewardship scheme planning that could be considered by the jurisdictions and industry as a common starting point when designing and implementing these initiatives in future.

This document presents the outcomes of these tasks.

Landfill disposal bans (bans) and conditional disposal restrictions (restrictions) for certain wastes are two of a suite of legislative/policy measures to control the environmental effects of hazardous waste and other materials. Additionally, landfill bans and conditional disposal restrictions can serve to increase the recovery of materials through driving investment in facilities/technologies for their treatment or recovery.

For the purpose of this report a landfill ban is defined as an outright exclusion of disposal at landfill. Conditional disposal restrictions are defined as applying to any material that can only be disposed of at an appropriately licensed landfill or requires pre-sorting or pre-treatment prior to disposal. These bans/restrictions may apply to single, uniquely identifiable waste products or to particular streams or groups of materials displaying similar physical or chemical characteristics. Bans or restrictions may also apply only to certain amounts or concentrations of these wastes or materials.

Bans and restrictions throughout Australia and internationally vary in their objectives and results. They are rarely used as the sole instrument of waste management, but often interact with other mechanisms for waste management control, such as the market based instruments of strategic pricing, i.e. pricing landfill disposal for particular materials artificially high to encourage alternative processing, and Product Stewardship Schemes. Selective licensing of landfills can also effectively amount to a ban if there is no landfill licensed to receive a particular substance.

There are a number of different hazardous waste landfill bans/restrictions in place in the different states and territories of Australia. Each jurisdiction generally uses a different set of tools, in conjunction with these bans and restrictions, to control hazardous (and other) wastes.

The Australian Capital Territory, South Australia and Victoria have been the most active jurisdictions in applying landfill bans/restrictions in order to reduce the effect of waste on human health and the



environment as well as to manage hazardous waste. There are a number of reasons for the variations between states, including;

- 1. Availability of technology to divert waste from landfill or pre-treat waste; and
- 2. Availability of different landfill classes licensed to receive hazardous/controlled waste.

Generally, most hazardous wastes are managed through conditional disposal restrictions that require pretreatment prior to disposal at landfill, for example asbestos, medical and related wastes, Polychlorinated Biphenyls and Organochlorine pesticides. Tyres are banned either state wide or geographically segregated in South Australia, Western Australia, Tasmania and NSW. E-waste is banned in South Australia and considered for banning in Victoria and computers and televisions are banned in the Australian Capital Territory (ACT). All Liquid waste is effectively banned in the ACT as there is no licensed facility to accept liquid waste in the jurisdiction and is banned outright in South Australia. All other jurisdictions accept liquid wastes at designated licensed facilities. South Australia also bans lead acid batteries which are also in the pipeline for banning in Victoria and are geographically banned (from small communities) in Northern Territory.

South Australia bans vehicles, white goods, fluorescent lighting and some paint from landfill also. Fluorescent lighting is in consideration for a landfill disposal ban in Victoria and Queensland. Most states have conditional disposal restrictions any hazardous waste that may exhibit any of the characteristics of Schedule A waste¹, which often includes materials such as Spent Pot Linings and Spent Catalyst, dependent on their level of contamination. Radioactive waste is banned from landfill in Queensland, geographically banned in Northern Territory (small communities) and is subject to conditional disposal restrictions in NSW.

A summary of hazardous wastes banned, restricted or considered for product stewardship are listed by jurisdiction in Table 1. The table distinguishes those materials banned outright, those banned by de facto (i.e. there is no facility licensed to accept such wastes), those which are banned geographically (i.e. those which are accepted for landfill in metropolitan or rural regions only), those which have a conditional disposal restriction in place (i.e. must be processed or treated prior to disposal), those which are in the pipeline for a form of ban and those which are currently being considered under state wide product stewardship schemes.

Lithium ion batteries have been analysed separately as an example of a potential material for product stewardship and landfill disposal bans. Further information can be found in 0.

¹ Defined as all waste listed in Appendix A of the Basel Convention for Transboundary movement of waste



Waste	АСТ	SA	Vic	Tas	Qld	WA	NT	NSW
Waste with Schedule A								
PCBs								
OCPs								
Asbestos								
Contaminated soil/rock								
Computers & Televisions								
All e-Waste								
Sharps								
Clinical								
Human Tissue								
Human body parts								
Cytotoxic								
Pharmaceuticals								
Chemical								
Liquid Waste								
Lead Acid Batteries								
Tyres								
Vehicles								
White Goods								
Fluorescent lighting								
Paint								
Oils								
Mobile Phones								
Agvet Chemical Containers								
Radioactive Wastes								
Кеу								
Banned								
de Facto Ban								
Geographical Ban								
Conditional Disposal Restriction								
In the Pipeline								
Considered for PS								

Table 1 - Materials banned, restricted or considered for Product Stewardship by jurisdiction

Travel distances between generators and processors, and the need to ensure the travel is safe, is a factor limiting the implementation of further hazardous waste bans, especially for denser/restricted materials which are not economically viable or safe to transport to suitable processors. Such materials are easily recycled in the metropolitan centres where handlers/processors are situated close to generators and markets, but are not easily processed/handled rurally where there are very few processors. A ban would require investment in rural infrastructure to reduce the financial burden on hazardous waste generators in those regions so as to avoid an anti-competitive cost impost.



This initial analysis demonstrates the potential for Product Stewardship and landfill bans to work together in mutual support. Product stewardship schemes require the establishment of processing infrastructure to recover and manage hazardous materials, while landfill bans prohibit the cheaper alternative and thereby assist in ensuring the requisite supply of feed material for processing is available. This in turn supports the financial viability of the processing infrastructure. Announcing product stewardship schemes and landfill disposal bans together, but phasing them sequentially, enables the responsible jurisdiction to provide a definitive date for a ban to take effect, while ensuring the necessary infrastructure for alternative treatment is in place.



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1. Background

1.1 Desktop Review

MRA has been commissioned by the Department of the Environment and Energy to document the current status of landfill bans and conditional disposal restrictions for hazardous waste in Australia. Specifically, to:

- 1. Document the current situation in Australia regarding landfill bans and conditional disposal restrictions that apply to different types of hazardous wastes.
- 2. Describe and analyse the current status of landfill bans and conditional disposal restrictions pertaining to hazardous wastes across the Australian jurisdictions.
- 3. List hazardous waste types banned from landfill disposal, by jurisdiction.
- 4. Describe the current state of hazardous waste related landfill bans and conditional disposal restrictions should the national and state/territory scales.
- 5. Address how landfill bans and conditional disposal restrictions could be developed and implemented in concert with product stewardship schemes.
- 6. Suggest a 'model approach' to ban/disposal restriction and product stewardship scheme planning that could be considered by the jurisdictions and industry as a common starting point when designing and implementing these initiatives in future.

This document presents the outcomes of the tasks undertaken in this study.

2. Current State of Bans and Conditional Disposal Restrictions

2.1 Introduction

Bans and conditional disposal restrictions

Landfill disposal bans (bans) and conditional disposal restrictions (restrictions) for certain wastes are two of a suite of legislative/policy measures to control the environmental effects of hazardous waste and other materials. Additionally, landfill bans and conditional disposal restrictions can serve to increase the recovery of materials through driving investment in facilities/technologies for their treatment or recovery.

For the purpose of this report a landfill ban is defined as an outright exclusion of disposal at landfill. Conditional disposal restrictions are defined as applying to any material that can only be disposed of at an appropriately licensed landfill, or can only be disposed of if concentration limits are not exceeded, or in small (below threshold) amounts, or requires pre-sorting or pre-treatment prior to disposal. These bans/restrictions may apply to single, uniquely identifiable waste products or to particular streams or groups of materials displaying similar physical or chemical characteristics.

Bans and restrictions throughout Australia and internationally vary in their objectives and results. They are rarely used as the sole instrument of waste management, but often interact with other mechanisms for waste management control, such as the market based instruments of strategic pricing and Product Stewardship



Schemes. Selective licensing of landfills can also effectively amount to a ban if there is no landfill licensed to receive a particular substance.

Conditional disposal restrictions can take both positive and negative forms. For example, in South Australia, residents can dispose of paint as long as it is under 20L (positive) but in almost all jurisdictions asbestos waste is banned from landfill unless wrapped and buried to a legislated standard.

Bans/restrictions considered in this review are limited to those dictated by waste properties, where the ban is based on particular physical, chemical or biological properties, and those which display the properties of hazardous waste.

Hazardous waste materials are restricted to those defined as having the potential to harm human health, damage property or cause harm to the environment due to their physical, chemical and biological properties. These materials may be solids, liquids or gases. Hazardous waste materials include many commonly found industrial, commercial, pharmaceutical, agricultural and domestic chemicals, for example paint, cleaning chemicals, degreaser, detergent, pesticides, herbicides, fuel, welding fume and energy efficient lighting (e.g. compact fluorescent lamps). Hazardous waste materials covered in this report are as defined in the *Hazardous Waste (Regulation of Exports and Imports) Act 1989*, which lists waste that have any of the characteristics mentioned in Annex III, or Annex I (unless they do not possess any of the characteristics contained in Annex III) to the *Basel Convention*.

This review has also considered landfill bans and conditional disposal restrictions as they relate to Household Hazardous Waste (HHW) products. HHW products are defined as products that originate in the Municipal Solid Waste (MSW) stream that are potentially dangerous to living beings and/or the environment when disposed of. This includes both solid and liquid waste for example:

- 1. Components of electronic waste such as cadmium and PVC sheathing on cables; and
- 2. Household chemicals such as bleach and paints.

Geographical scope

This review will focus primarily on the range of different bans/restrictions in place in the different states and territories of Australia and how they relate to Hazardous Waste Materials and HHW. All bans/restrictions are supported by federal and state regulations and policies, but these are often used differently in differing jurisdictions with different outcomes. Most bans in Australia are based on the properties and potential effects of the materials as opposed to being driven by pressures to move away from landfill for capacity reasons, with the exception of Victoria.

Whilst the main focus of this review is on the States and Territories of Australia, a brief review of bans and restrictions for Hazardous and HHW in Europe has also been conducted for comparison and further analysis. There are many landfill bans in Europe that were developed and have been maintained for many decades, which gives a strong indication of how effective bans can be in order to achieve waste outcomes. Though many of these bans relate primarily to material recovery, some aim to reduce the environmental impact of landfills on air, land and water.

This review will consider all bans/restrictions currently in place in order to analyse how landfill bans/restrictions could be used alongside complementary instruments to assist Australia to deliver both diversion outcomes as well as hazard control/reduction.



Some options for how product stewardship and landfill bans or conditional disposal restrictions could be planned and implemented in an integrated way include:

1. Adding a formal check point requirement when doing a Regulation Impact Statement (RIS) on any Product Stewardship scheme (whether a Commonwealth or Council of Australian Government's RIS) to consider integration with restrictions or bans on landfill disposal of the products or materials under stewardship consideration.

2. Periodic, nationally-coordinated, multi-jurisdictional review (with reference to international standards and best practice) of current ban/restriction listings, including their timing, scope and thresholds.

3. If new bans or conditional disposal restrictions are being considered, the analysis (including RISs) should include a specific discussion of the implications of the change for any extant or under-development stewardship schemes.

3. Bans by Jurisdiction

3.1 Introduction

There are a number of different hazardous waste landfill bans/restrictions in place in the different states and territories of Australia. Each jurisdiction generally uses a different set of tools, in conjunction with these bans and restrictions, to control hazardous (and other) wastes.

The coverage of bans and restrictions varies from state to state. Some states apply bans for certain material types throughout the entirety of the state, some to only particular areas within the state. Bans and restrictions within different states and jurisdictions are applied with a variety of geographical scope. Some states apply bans to the whole of their jurisdictional boundaries, whereas some states apply certain bans/restrictions to 'zones' within states. For example, South Australia applies bans in a zoned approach as opposed to state-wide. This zoned approach is often a product of infrastructure accessibility, which is normally located within metro regions as opposed to rural regions.

There are currently three ways hazardous wastes are classified. These are by:

- 1. constituents;
- 2. hazardous properties; or
- 3. source.

The structure of hazardous waste bans and restrictions by source is often influenced by the material quantities dictated by its waste stream source, i.e. whether it is a 'commercial' or a 'household' quantity. For example, mercury containing lamps/tubes are banned in 'commercial quantities' by many jurisdictions, but not necessarily in 'household quantities'.

Generally, the Australian Capital Territory, South Australia and Victoria have been the most active state/territories in applying landfill bans/restrictions in order to reduce the effect of waste on human health and the environment as well as to manage hazardous waste. There are a number of reasons for the variations between states, including;

- 1. Availability of technology to divert waste from landfill or pre-treat waste; and
- 2. Availability of different landfill classes licensed to receive hazardous/controlled waste.



3.2 Commonwealth

National Environment Protection Measures (NEPMS)

The Commonwealth *National Environment Protection Council Act* 1994 allow the National Environment Protection Council to make *National Environmental Protection Measures (NEPMs)* which relate to the management of hazardous materials and waste. The two NEPMs that relate to hazardous waste are the:

- 1. Controlled Waste NEPM; and
- 2. National Pollutant Inventory NEPM.

Though neither of these NEPMs specifically relate to hazardous waste bans or conditional disposal restrictions, they highlight the minimum list of materials that each state must control the management of.

These characteristics are described in Table 2 below Table 2.

Table 2 - Hazardous waste characteristics as described in the Controlled Waste NEPM²

Dangerous Goods Class (UNClass*)	UN Code	Explanation
1	H1	Explosive
		An explosive substance or waste is a solid or liquid substance or waste (or mixture of substances or wastes) which is in itself capable by chemical reaction of producing gas at such a temperature and pressure and at such a speed as to cause damage to the surroundings.
3	H3	Flammable liquids
		The word "flammable" has the same meaning as "inflammable". Flammable liquids are liquids, or mixtures of liquids, or liquids containing solids in solution or suspension (for example, paints, varnishes, lacquers, etc., but not including substances or wastes otherwise classified on account of their dangerous characteristics) which give off flammable vapour at temperatures of not more than 60.5 degrees Celsius, closed-cup test, or not more than 65.6 degrees Celsius, open-cup test. (Since the results of open-cup tests and of closed cup tests are not strictly comparable and even individual results by the same test are often variable, regulations varying from the above figures to make allowances for such differences would be within the spirit of the definition.)
4.1	H4.1	Flammable solids
		Solids or waste solids, other than those classified as explosives, which under conditions encountered in transport are readily combustible, or may cause or contribute to fire through friction.

² Schedule A list 2 of the National Environment Protection (Movement of controlled waste between States and Territories) Measure



Dangerous	UN Code	Explanation
Class		
(UNClass*)		
4.2	H4.2	Substances or wastes liable to spontaneous combustion
		Substances or wastes that are liable to spontaneous heating under normal conditions encountered in transport, or to heating up in contact with air, and being then liable to catch fire.
4.3	H4.3	Substances or wastes which, in contact with water, emit flammable gases
		Substances or wastes which, by interaction with water, are liable to become spontaneously flammable or to give off flammable gases in dangerous quantities.
5.1	H5.1	Oxidising
		Substances or wastes which, while in themselves not necessarily combustible, may, generally by yielding oxygen, cause or contribute to, the combustion of other materials.
5.2	H5.2	Organic peroxides
		Organic substances or wastes, which contain the bivalent-O-O-structure, are thermally unstable substances, which may undergo exothermic self-accelerating decomposition.
6.1	H6.1	Poisonous (acute)
		Substances or wastes liable either to cause death or serious injury or to harm human health if swallowed or inhaled or by skin contact.
6.2	H6.2	Infectious substances
		Substances or wastes containing viable micro-organisms or their toxins, which are known or suspected to cause disease in animals or humans.
8	H8	Corrosives
		Substances or wastes which, by chemical action, will cause severe damage when in contact with living tissue, or in the case of leakage, will materially damage, or even destroy, other goods or the means of transport; they may also cause other hazards.
9	H10	Liberation of toxic gases in contact with air or water
		Substances or wastes which, by liberation with air or water, are liable to give off toxic gases in dangerous quantities.



Dangerous Goods Class (UNClass*)	UN Code	Explanation
9	H11	Toxic (delayed or chronic)
		Substances or wastes which, if they are inhaled or ingested or if they penetrate the skin, may involve delayed or chronic effects, including carcinogenicity.
9	H12	Ecotoxic
		Substances or wastes which if released present or may present immediate or delayed adverse impacts to the environment by means of bioaccumulation and/or toxic effects upon biotic systems
0	1110	Comple of violding on other metericlustich recorded U1 U12
9	H13	Capable of yielding another material which possesses H1-H12
		Capable by any means, after disposal, of yielding another material, e.g., leachate, which possesses any of the characteristics listed above.
		Other reasons
		Potential to have a significant adverse impact on ambient air quality. Potential to have a significant adverse impact on ambient marine, estuarine or fresh water quality.

*UN Class and Code relates to the hazard classification system included in the United Nations Recommendations on the Transport of Dangerous Goods as used in Australia.

Controlled Waste NEPM

Under the Controlled Waste NEPM, producers are required to:

- 1. Obtain a consignment authority from the State or Territory of destination prior to dispatching a shipment of controlled waste;
- 2. Ensure that the transporter is appropriately licensed;
- 3. Provide certain information specific to the shipment of controlled waste to the transporter;
- 4. Meet certain notification requirements; and
- 5. Maintain records relevant to the shipment of controlled waste for at least 24 months after consignment of the load.

With regards to waste and disposal, controlled waste disposal facilities are managed under environmental authorisations (such as licences).

National Pollutant Inventory (NPI) NEPM

The NPI tracks emissions of 93 substances to air, land and water as well as the transfer of these substances in wastes.

The NPI assesses:



- 1. Point source emissions data; and
- 2. Aggregate emission data.

3.3 New South Wales

Introduction

New South Wales (NSW) has developed a regulatory regime for handling hazardous waste and special waste when being treated or disposed of. Industries generating waste must classify their wastes in order to select the appropriate avenue for their handling, transportation and disposal.

Waste in NSW is classified in accordance with the *Protection of the Environment Operations Act 1997* and the classification is outlined in the Environment Protection Authority's (EPA's) *NSW Waste Classification Guidelines (2014)*. This classifies NSW wastes into groups that pose similar risks to the environmental and human health. The classes of waste are defined in clause 49 of Schedule 1 of the *Protection of the Environment Operations Act 1997 (POEO Act)*:

- Special waste;
- Liquid waste;
- Hazardous waste;
- Restricted solid waste;
- General solid waste (putrescible); and
- General solid waste (non-putrescible).

Hazardous waste

The following waste materials are pre-classified by the EPA as 'hazardous waste' and are not suitable for landfill disposal in NSW since they contain a high level of contaminants and exhibit harmful properties to human health and the environment:

- Containers having previously contained a substance of Class 1,3,4,5 or 8 within the meaning of the *Transport of Dangerous Goods Code*, or a substance to which Division 6.1 of the *Transport of Dangerous Goods* Code applies, from which residues have not been removed by 'Washing2' or vacuuming. 'Washing2' refers to a cleaning method that must be as good as or better than the triple-rinsing method;
- 2. Coal tar or coal tar pitch waste (tarry residue from the heating, processing or burning of coal or coke) comprising of more than 1% (by weight) of coal tar or coal tar pitch waste;
- 3. Lead-acid or nickel-cadmium batteries;
- 4. Lead paint waste arising from non-residential or educational premises or child care institutions; and
- 5. Any mixture of the wastes referred to above.

In certain cases, the EPA may grant immobilisation approvals which allow contaminants in hazardous waste to stay securely fixed in the waste for a long period of time, instead of being released into the landfill leachate. There are four ways of immobilising contaminants; natural immobilisation, chemical fixation, micro-encapsulation and macro-encapsulation. Once immobilised, NSW no longer considers these wastes to be hazardous, and may permit their disposal to landfill.



Hazardous waste bans

Special waste

The following special waste types have been banned from landfills in NSW (Hyder, 2010). In addition, e-waste has been banned from landfill at the Kimbriki landfill by Pittwater, Mosman, Manly, and Warringah Councils.

Clinical and related waste

Under Schedule 1 of the *Protection of the Environment Operation Act 1997*, 'clinical and related waste' includes clinical waste, cytotoxic waste, pharmaceutical, drug or medicine waste, and sharps waste. For disposal of clinical and related waste, Schedule 1 of the *Protection of the Environment Operations Act 1997* covers licensing requirements and Part 11 of the *Protection of the Environment Operation (Waste) Regulation 2014* outlines all requirements relating to the storage, transport and disposal of clinical waste. Health care facilities have the responsibility to ensure that their clinical and related waste is transported, treated and disposed of appropriately (Waste Management Guidelines for Health Care Facilities, 1998).

Disposal methods for clinical and related waste must comply with the regulatory control requirements imposed by the EPA under the Waste Regulation and other relevant environmental legislation (*Waste Management Guidelines for Health Care Facilities, 1998*). The *Waste Management Guidelines for Health Care Facilities 1998* were produced to assist health care facilities in complying with legislative requirements and to achieve improvements in safe waste management.

Clinical waste, cytotoxic waste, pharmaceutical, drug or medicine waste, sharps waste need to be treated appropriately before disposal in NSW landfills. Once clinical waste has been treated by a process acceptable to NSW Health, it may be reclassified in accordance with the Waste Guidelines before recycling or disposal (*Waste Management Guidelines for Health Care Facilities, 1998*). Available waste treatment procedures in NSW include:

- Autoclaving (steam sterilisation)
- Microwaving
- Mechanical-chemical disinfection
- Incineration (used for pharmaceutical and cytotoxic waste).

E-waste

All e-waste has been banned from kerbside collections for disposal at landfill in Pittwater Council, Mosman Council, Manly Council, Warringah Council, Hurstville Council, as well as Hawkesbury and Blacktown.

SHOROC Councils are fortunate amongst Sydney metropolitan Councils in that they own and operate their own local landfill, at Kimbriki, and are positioned to enforce specific acceptance criteria on disposals at the landfill. As of 2009, e-waste is no longer accepted in kerbside collections in the Manly, Mosman, Warringah and Pittwater Council areas.

Two bans were progressively introduced:

- 1. a ban prohibiting the disposal to landfill at Kimbriki of designated e-waste; and
- 2. a ban prohibiting uplift of designated e-waste from kerbside hard waste clean-up collections on the part of the designated collection contractor.



The first ban sets out the rationale for the move, that no further designated e-waste can be disposed of at Kimbriki landfill in order to minimise future environmental risks. This ban prevents designated e-waste being received and dropped off to landfill at Kimbriki.

The second ban prevents designated e-waste being collected in kerbside hard waste clean-up collections and thus delivered to Kimbriki for disposal. Residents of SHOROC councils were alerted to alternatives such as commercial services on a fee for service basis, or drop-off of designated e-waste in conjunction with household hazardous wastes periodically organised by the NSW EPA in collaboration with Councils.

Hurstville City Council has also implemented a ban on the collection of e-waste from kerbside collection services. Residents must now drop-off their unwanted e-waste to a free electronic waste drop-off at the Hurstville City Council works depot.

Conditional disposal restrictions

There are also a number of conditional disposal restrictions for waste materials in NSW.

Waste Tyres

Under Section 143 of the *Protection of the Environment Operations Act 2007*, used, rejected, unwanted and retreaded tyres (including casings, seconds, shredded tyres and tyre piece), also known as waste tyres, are required to be managed responsibly. Tyres must only be processed or disposed of in a licensed facility and must now be tracked under new regulations.

Asbestos

Asbestos waste is regulated under the Protection of the *Environment Operations Act 1997* and the Protection of the Environment Operations (Waste) Regulation 2005, which are administered by the Environment Protection Authority.

A total ban on any activity involving asbestos products became effective from December 2003. It is now illegal to dispose of asbestos waste unless landfills can lawfully receive this waste. There are several landfill sites accepting asbestos in metropolitan and regional NSW.

Under the POEO Act, the Environment Protection Authority or local councils are the assigned regulatory authority to address illegal disposal of asbestos waste. Prevention notices can also be obtained from these authorities where asbestos waste has been handled inappropriately (Asbestos Blueprint, 2011). Figure 1 shows the compliance actions and regulators for the transport and disposal of asbestos waste. The Environment Protection Authority is responsible for the control framework for the transport and disposal of asbestos asbestos waste and for issuing licences to store and dispose of asbestos waste (publicly available on the POEO Public Register).

Clause 42(4) of the *Protection of the Environment Operations Waste Regulation 2005* prescribes the following requirements for disposal of asbestos waste:

- a. Any form of asbestos waste must be disposed of only at a landfill site that may lawfully receive waste.
- b. The occupier of the landfill site must be informed by the person delivering the waste that the delivered waste contains asbestos.



- c. The asbestos waste that is being disposed of must be unloaded and disposed of in such a manner as to prevent the generation of dust or the stirring up of dust.
- d. Once the asbestos waste has been disposed of at the landfill, it must be covered with virgin excavated natural material or other material as approved in the facility's environment protection licence:
 - Initially (at the time of disposal), to a depth of at least 0.15 metres
 - At the end of each day's operation, to a depth of at least 0.5 metres
 - Finally, to a depth of at least 1 metre (for bonded asbestos waste or asbestos-contaminated soils) or 3 metres (for friable asbestos material) beneath the final land surface of the landfill site.

Figure 1 - Compliance actions and regulators for the transport and disposal of asbestos waste

		Compliance Actions	Regulators Bold = Lead Organisation		
Scenario 1 Waste temporarily stored on-site.		Verify storage on-site is in accordance with environmental and OHS Legislation.	1. 2.	WorkCover NSW (worksites) EPA and Local Council (non-worksites)	
Scenario 2 Waste be transported by vehicle.		Verify transport is carried out according to waste transport requirements under POEO (Waste) Reg 2005 and Dangerous Goods (Road & Rail Transport) Reg 2009.	1. 2.	EPA WorkCover NSW	
Scenario 3 Waste disposed of on-site.		Advice for on-site disposal by EPA. Local Council to confirm if permitted under Planning Controls and require recording of on-site disposal on S149 property certificate.	1. 2.	EPA (advice) Local Council (consent required to dispose onsite) (S149 property certificate and development assessment process)	
Scenario 4 Waste going to landfill site.		EPA regulates compliance and provides list of licensed landfill sites. Local Councils and private businesses provide community access to landfill facilities and operate licensed landfill facilities.	1. 2.	EPA (advice) Local Council (if managing licensed landfill	
Scenario 5 Waste to be transported interstate.	\Rightarrow	Verify waste is tracked according to POEO (Waste) Regulation 2005.	1.	EPA (advice)	
Scenario 6 Waste for export.		Customs to verify export controls in compliance with Commonwealth Hazardous Waste Legislation. Exemptions may be granted by the Federal Minister for Workplace Relations through Workplace Relations Minister's Council. Customs, WorkCover & EPA to consult and ensure a coordinated approach to any export arrangements.	1. 2. 3.	Australian Customs & Border Protection Service WorkCover NSW DEEWR ¹²	

Policies in the pipeline

Monitoring asbestos and waste tyres

WasteLocate is a new NSW wide online system developed by the EPA that tracks the movement of asbestos and waste tyres from generation to a lawful receiving facility, which assists monitoring of lawful disposal of in NSW.

Chemical CleanOut - Household chemicals

The NSW EPA's CleanOut program is expected to transition to collect only household chemicals because the Community Recycling Centres being developed by the NSW EPA will collect all other problem wastes. The aim of these two programs is to improve the management of household problem waste in NSW.

Household chemicals included in the CleanOut program:



- Solvents and household cleaners;
- Floor care products;
- Ammonia based cleaners;
- Fluorescent globes and tubes;
- Car batteries;
- Motor oils, fuel and fluids;
- Paint and paint related products;
- Pesticides and herbicides;
- Poisons;
- Gas bottles;
- Fire extinguishers;
- Pool chemicals;
- Hobby chemicals;
- Acids and alkalis;
- Fluorescent globes and tubes;
- Smoke detectors;
- Paint and paint-related products;
- Gas bottles;
- Fire extinguishers;
- Car and household batteries; and
- Motor oils and cooking oils.

To complement the Household Chemical CleanOut program, the NSW EPA and the NSW Environmental Trust have funded and established eighteen Community Recycling Centres, to provide a permanent solution for the disposal of problem waste. These centres became operational in 2014-2015 and collected 199,151kg of problem wastes. A \$5.2 million in grant funding has been awarded to build a further 36 centres. Community Recycling Centres allow NSW householders to safely and conveniently dispose of:

- 1. Paint;
- 2. Gas bottles and fire extinguishers;
- 3. Household and car batteries;
- 4. Motor oils;
- 5. Fluorescent globes and tubes; and
- 6. Smoke detectors.

These centres are located in Bathurst, Blue Mountains, Bungendore, Casino, Coffs Harbour, Gilgandra, Grafton, Kempsey, Kyogle, Lake Macquarie, Lismore, Liverpool, Maclean, Nambucca, Port Macquarie, Salamander Bay, Taree and Uralla.

Though these materials are currently not banned from landfill, the provision of infrastructure to collect these materials could assist NSW to successfully implement landfill bans for certain HHW products.



Additional regulatory tools

There are also a number of additional regulatory tools for hazardous waste management in NSW. These are as follows:

- 1. Licensing;
- 2. Chemical Control Orders (CCO);
- 3. Waste tracking;
- 4. Immobilisation approvals;
- 5. Liquid waste levy; and
- 6. Dangerous goods legislation.

3.4 South Australia

Introduction

Under the *Environment Protection (Waste to Resources) Policy 2010,* from September 2010 'hazardous waste' was banned from disposal to landfill in Metropolitan Adelaide and all regional and remote areas of South Australia. South Australia EPA defines hazardous waste as waste having a characteristic described in Schedule A list 2 of the *National Environment Protection (Movement of controlled waste between States and Territories) Measure,* as amended from time to time.

Hazardous waste bans

The waste identified in Table 3 below is prohibited landfill waste for the whole state. Householders are able to dispose of hazardous waste at a Household Hazardous Waste Depot. Wastes from businesses and government agencies are not accepted. Commercial waste treatment companies may dispose of this hazardous waste.

Landfill bans (for both hazardous and non-hazardous wastes) are listed in the *Environment Protection Act 1993*, and the *South Australia Environment Protection (Waste to Resources) Policy 2010* under Schedule 4. These are detailed in Table 3 below (all were effective as of 1 September 2010).

Table 3 - Schedule 4 landfill disposal bans

Waste Type Hazardous waste Lead acid batteries Liquid waste Medical waste Medical waste Oil Tyres - whole tyres and tyres that have been exposed to radioactive materials through mining operations Vehicles Aggregated cardboard and paper - for resource recovery separate from other waste Aggregated glass packaging - for resource recovery Aggregated metals - aluminium, copper, steel or iron or a blend of alloy of any such metals, whether alone

or with other recyclables, other than metal products with components of different metals that cannot be readily separated.



Waste Type

- 11. Aggregated PET or HDPE plastic packaging for resource recovery (whether alone or with other recyclables)
- 12. Vegetative matter collected by councils aggregated for resource recovery and collected by a council by a kerbside waste collection service operated as a separate collection service for such waste, other than such waste collected from within a quarantine area under the *Fruit & Plant Protection Act 1992*.
- 13. PP or LDPE plastic packaging aggregated for resource recovery (whether alone or with other recyclables)
- 14. Whitegoods
- 15. PVC or PS plastic packaging aggregated for resource recovery (whether alone or with other recyclables)
- 16. Fluorescent lighting and any other lighting that contains mercury
- 17. Computer monitors and televisions, including components, subassemblies and consumables that are part of the equipment when discarded.
- 18. Other electrical or electronic equipment.

3.4.1.1 E-waste

South Australia implemented a staged ban on the direct disposal of e-waste to landfill over a three-year period (2010-2013), commencing before the national computer and television product stewardship scheme was operational from [add in date]. A number of individual landfills and councils in South Australia banned all e-waste from landfill prior to the state-wide ban, including the City of Mt Gambier in 2008.

Direct disposal of e-waste to landfill has been progressively banned by the South Australian government as shown in Table 4.

Waste	Area	Effective date
Whitegoods	Metropolitan Adelaide	1 September 2010
	All of State	1 September 2011
Televisions and Computers	Metropolitan Adelaide	1 September 2012
	All of State	1 September 2013
Fluorescent Lighting	Metropolitan Adelaide	1 September 2012
	All of State	1 September 2013
Other Electrical or Electronic Equipment	Metropolitan Adelaide	1 September 2013
	All of State	1 September 2013

3.4.1.2 Whitegoods and other e-waste

Whitegoods will usually be accepted by scrap metal recyclers and in metropolitan areas, free collection may be available. Sites accepting TVs and computers for free recycling may also accept other electronic and electrical waste for free recycling but sometimes, depending on the item, there is a fee.



Commercial recyclers or local transfer stations will also accept most other e-waste separately. The cost of the recycling for transfer stations or commercial recyclers depends on the amount of recyclable material in the item. For example, materials like copper and steel have a higher value than glass or plastic.

3.4.1.3 Lighting

Householders can drop off their household lights including halogen, incandescent and fluorescent globes for free at any Banner, Mitre 10 and Tru Value hardware stores in metropolitan and regional South Australia through the Zero Waste SA Backlight program. Fluorescent tubes can also be taken to DeLights in Ashford, or IKEA near the Adelaide Airport.

3.4.1.4 Chemical waste

Farmers and primary producers are encouraged to dispose of unwanted agricultural chemicals through the industry based and funded ChemClear. The national chemical waste disposal program called ChemClear has been established by an alliance of Croplife Australia Ltd, Animal Health Alliance, Veterinary Manufacturers Association, the National Farmers Federation and the Local Government Association together with Agsafe Ltd. Its purpose is to give farmers a safe way to dispose of unused and unwanted rural, agricultural and veterinary chemicals that are currently registered.

3.4.1.5 Oil

Persons wishing to dispose of commercial quantities of waste oil should contact an appropriate commercial recycling company. Households can drop their waste oil off at a Hazardous Household Waste Depot. Zero Waste South Australia operates a Hazardous Waste Collection Program that also accepts waste oil. Green Industries SA will operate this service once the transition to the new agency has been fully realised.

3.4.2 Conditional Disposal Restrictions

There are a number of materials in South Australia that are subject to conditional disposal restrictions as opposed to outright bans.

3.4.2.1 Asbestos

Asbestos waste must be taken to a landfill or waste transfer station that is licensed to receive it.

Asbestos taken to correctly licensed landfills must be double wrapped in manageable-sized packages in thick (>200 micron) plastic, and duct tape must be used to seal the packages. Asbestos may also be placed in plastic-lined bins supplied by an EPA licensed waste transporter. The plastic liners should then be taped down over the contents of the bin. All packages must be labelled to identify the contents before being transported to a landfill or waste transfer station licensed by the EPA to receive asbestos.

3.4.2.2 Paint

Householders can dispose of up to 20L of paint at household and farm chemical drop-off events, which aim to avoid long-term chemical waste storage and long-term environmental and financial liability. However, hardened paint and empty paint tins are not accepted. Dry paint, varnish, sealants and adhesives can be disposed of in the household general waste bin once it has been left out to solidify, and dry paint tins can be disposed of in the household recycling bin.



3.4.2.3 Unsorted mixed C&I waste

South Australia also puts a conditional disposal restriction that C&I mixed waste must be pre-sorted prior to landfilling. These restrictions are outlined by guidelines that describe that sufficient treatment must be carried out according to landfill bans and alignment with the waste hierarchy, to the extent reasonably achievable. This involves the appropriate identification, retrieval and redirection of waste, with the application of principles of resource recovery and minimisation of contamination.

3.4.3 Potential Policies in the Pipeline

South Australia has implemented a number of instruments that regulate hazardous waste, such as landfill pricing and bans on e-waste, but there are some further targets as listed in their 2015-2020 waste management strategy (the Strategy). South Australia aims to maximise diversion to the extent practically and economically achievable.

Specific problematic and hazardous waste targets listed in the Strategy are:

- 1. Encourage the recovery and treatment of oils, solvents and other valuable materials for re-use;
- 2. Reduce hazards through hazardous waste collection, recycling and appropriate disposal;
- 3. Encourage reuse of waste fill and low level contaminated soils where appropriate as a priority and remediate high level contaminated soils for re-use;
- 4. Promote the adoption of Extended Producer Responsibility, including State-based approaches where considered necessary, and encourage continuous improvement in existing producer responsibility and related schemes for example in relation to televisions and computers (e-waste) and packaging;
- 5. Reduce hazards through hazardous waste collection, recycling and appropriate disposal;
- 6. Encourage use of less toxic alternatives in industry and in households, reducing hazards, injuries and health impacts; and
- 7. Provide convenient drop-off facilities for unwanted household and farm hazardous materials.



3.5 Australian Capital Territory

Introduction

The predominant legislation in the Australian Capital Territory (ACT) that protects the environment from pollution and its effects is the *Environment Protection Act 1997* (the Act). The Act provides the regulatory framework to help reduce and eliminate the discharge of pollutants into the air, land and water.

The Act establishes the Environment Protection Authority (EPA) as the statutory decision maker for environmental regulation and policy. The EPA administers legislation covering air and water quality, waste, contaminated land, noise, pesticides and hazardous waste.

The handling of hazardous materials is stipulated by the requirements in the Act as well as in the *Environment Protection Regulation (The Regulation), 2005.* The details of the obligations for Hazardous Waste are also outlined in the Hazardous Materials Environmental Protection Policy, 2010, that is required under Part 4 of The Act.

Hazardous Waste is managed in ACT with the following principles in mind:

- 1. The level of regulatory control over a specific activity involving a particular hazardous material should reflect the risk to the environment from that activity with that material;
- 2. Where possible, regulatory controls on hazardous materials should not adversely impact on regional commerce and should be consistent with national competition policy principles; and
- 3. It is consistent with national and international agreements relating to hazardous waste.

Hazardous waste is a subset of Regulated waste under ACT legislation, and covers wastes that exhibit any of the hazardous characteristics of the Controlled Waste NEPM, for example PCBs and Organochlorine Pesticides (OCPs), as well as wastes such as Industrial Waste.

The Act recognises that there may be instances where the risks associated with hazardous materials and wastes can be eliminated through appropriate treatment, which allows the materials to be used or reused for other purposes.

Hazardous Waste Bans

The Waste Classification Guidelines dictate how materials need to be landfilled. Often the lack of licensed facility for certain waste types in the ACT equates to a de facto ban.

Liquid waste

There is no liquid waste disposal facility in the ACT. All liquid waste, including hazardous liquid waste is required to be transported interstate for disposal or treatment. The transportation of this waste falls under the provision of the Controlled Waste NEPM. Though not a specific ban, the lack of licensed landfill for liquid waste has the same policy outcome as an outright ban, that no liquid waste can be disposed of in ACT and alternative disposal/ treatment outside of the ACT must be sought.

Polychlorinated Biphenyls

Any PCB contaminated oil and/or equipment which has been removed must be transported to the Energy Services Environmental treatment facility located at Mitchell, ACT for reprocessing and recycling.



Computers, televisions and other e-waste

The ACT government was the first government to ban computers from landfill in 2005. In 2010 it was decided that televisions would be added to the ban. The ACT government asks householders and businesses to dispose of all televisions and computers at the Mitchell or Mugga Lane Resource management centres for free.

Organochlorine Pesticides (OCPs)

OCPs which have been collected and removed from use must be transported interstate for destruction and disposal. No OCPs are permitted for disposal in ACT, resulting in a de facto landfill disposal ban.

Conditional Disposal Restrictions

Asbestos

In the ACT asbestos waste is classified as an industrial waste and must be handled, transported and disposed of according to the National Occupational Health and Safety Commission Code of Practice and the Safe Removal of Asbestos.

Though domestic hazardous materials are not subject to specific landfill bans or conditional disposal restrictions, residents are encouraged to dispose of these for correct recycling at the Mugga Lane Resource Management Centre.

Contaminated soil

In ACT Contaminated soil must be assessed and classified in accordance with the ACT's Environmental Standards: Assessment and Classification of Liquid and Non-Liquid Wastes (2000). The disposal or beneficial reuse of contaminated soil or soil from a contaminated site requires EPA approval.

Clinical and related wastes

Clinical and related wastes in ACT are managed through the *Clinical Waste Act 1990*. Under the Act all clinical and related waste must be disposed at a facility declared by the Minister to be a disposal site for these materials.

Potential policies in the pipeline

Future policies for hazardous waste bans and/or conditional disposal restrictions in ACT are detailed in the ACT Waste Management Strategy.

Those relating to hazardous waste are under Outcome 3 of the ACT Waste Management Strategy to 'Manage Hazardous Waste'. Though no specific materials are planned for a ban to landfill, the government is committed to continuing to participate in national efforts to develop and maintain the safe handling and disposal of hazardous waste, so would likely consider any bans or conditional disposal restrictions in development elsewhere.



3.6 Victoria

Introduction

Hazardous waste management in Victoria is led by the scarcity of high end hazardous waste landfill space. This has driven Victorian hazardous waste classifications and approaches. The Victorian Government seeks to support the expansion of landfill bans via the development of the Prescribed Industrial Waste (PIW) classification structure.

Hazardous waste, is defined and classified as a 'Prescribed Industrial Waste' (PIW) in Victoria's environment protection laws. Hazardous waste is a by-product of everyday goods and services, such as the manufacturing of motor vehicles, paint and plastics, dry cleaning services, fast food outlets, dental surgeries and hospitals. The regulation and management of these wastes is now provided in Victoria through the *Environment Protection (Industrial Waste Resource) Regulations 2009*.

Hazardous Waste Bans

PIW destined for landfill must be assigned one of three hazard categories – A, B or C. Category A wastes are banned from landfill and require treatment before disposal, depending on the level of contaminants, this may ban both Spent Catalysts and Spent Pot Linings from landfill. Category B and C wastes can be accepted at best practice landfills that have approval from EPA to accept such wastes. The aim of the categorisation framework is to improve treatment standards and achieve greater waste separation to help identify further avoidance, reuse or recycling opportunities. There are different landfill levies for Category B, Category C and asbestos. Table 5 provides a summary of the Victorian hazardous waste category framework.



Table 5 - Hazardous waste categories³

Category	Description	Detail
Category A	Category A wastes are prescribed industrial wastes. These are banned from landfill, and require treatment prior to disposal.	 Class 1 (Explosive); Class 4.1 (Flammable solid); Class 4.2 (Spontaneously combustible); Class 4.3 (Dangerous when wet); Class 5.1 (Oxidising); Class 5.2 (Organic Peroxide); Class 6.1 (Toxic); Class 6.2 (Infectious); Class 8 (Corrosive); or Waste that generates gases that can be classified as Class 2.3 (Toxic Gas) dangerous goods under the Dangerous Goods Act 1985 when it comes into contact with air or water; or Waste with any contaminant concentration greater than the category A contaminant concentrations specified in the Solid Industrial Waste Thresholds, except for prescribed industrial waste that is contaminated soil; or Waste with any leachable concentration greater than the category A leachable concentrations specified in the Solid Industrial methods, except for prescribed industrial waste that is contaminated soil; or Contaminated soil with; any contaminant concentration greater than the category A contaminant concentrations specified in the Solid Thresholds; or any leachable concentration greater than the category A contaminant concentrations specified in the Solid Thresholds; or

³ Environment Protection (Industrial Waste Resource) Regulations 2009



Category	Description	Detail
		 Liquid waste other than: trade waste; or industrial waste water managed in accordance with specifications acceptable to the Authority; or
Category B	Category B waste includes: (1) Subject to subclause (2), category B waste is prescribed industrial waste—	 with— any contaminant concentration greater than the category B contaminant concentrations specified in the Solid Industrial Waste Thresholds, but not exceeding the category A contaminant concentrations, except for prescribed industrial waste that is contaminated soil; or any leachable concentration greater than the category B leachable concentrations, except for prescribed industrial waste that is contaminated soil; or any leachable concentration greater than the category A leachable concentrations, except for prescribed industrial waste that is contaminated soil; or that is contaminant concentration greater than the category B contaminant concentrations, except for prescribed industrial waste that is contaminated soil; or that is contaminant concentration greater than the category B contaminant concentrations specified in the Soil Thresholds, but not exceeding the category A contaminant concentrations specified in the Soil Thresholds, but not exceeding the category B leachable concentrations; or (ii) any leachable concentration greater than the category B leachable concentrations specified in the Soil Thresholds, but not exceeding the category A leachable concentrations; or that the Authority has classified as category B waste in accordance with Part 2.
	Excluding prescribed industrial waste that is category A waste under clause 1.	
Category C	(1) Subject to sub clause (2), category C waste is prescribed industrial waste	 with — any contaminant concentration greater than the category C contaminant concentrations specified in the Solid Industrial Waste Thresholds, but not exceeding the category B contaminant concentrations, except for prescribed industrial waste that is contaminated soil; or



Category	Description	Detail
		 any leachable concentration greater than the category C leachable concentrations specified in the Solid Industrial Waste Thresholds, but not exceeding the category B leachable concentrations, except for prescribed industrial waste that is contaminated soil; or
		 any contaminated soil with— any contaminant concentration greater than the category C contaminant concentrations specified in the Soil Thresholds, but not exceeding the category B contaminant concentrations; or any leachable concentration greater than the category C leachable concentrations specified in the Soil Thresholds, but not exceeding the category B leachable concentrations; or
	(2) This clause does not apply to prescribed industrial waste that is category A waste under clause 1 or category B waste under clause 2.	



In Victoria, classifications banning waste streams from landfill are issued when alternative reuse or recycling options are identified.

Currently, these include:

Classifications	Commencement Date
Industrial transformers	December 2011
Grease interceptor trap waste	June 2009
Used oil filters	June 2009
Large PIW containers (≥ 200 litre)	May 2010
Soils contaminated with organic compounds	October 2002

Hazardous Soil and Solid Industrial Waste are assessed and categorised using a risk assessment process to evaluate the potential risk profile of materials as follows.

Soil Hazard Categorisation and Management

Contaminated soils that display any specific hazard characteristic listed in Appendix A are categorised as a *Category A PIW*. The Soil Hazard Categorisation and Management guidelines also define soil hazard categorisation thresholds for assessment of contamination levels which in turn defines how the soil must be utilised/disposed of. Table 6 summarises the categorisation thresholds for soils.

Solid Industrial Waste Hazard Categorisation and Management

In Victoria, all waste generators must categorise wastes transported for disposal. If wastes are treated offsite, they need to be categorised by the waste processor prior to disposal. Waste processors are required to seek the relevant information from the waste generator on the nature of the waste, so that it can be treated appropriately. Waste which is characterised based on hazard characteristics defined in Table 6. Any solid industrial waste which displays one or more of the hazard characteristics listed in the following table is a *Category A* waste and is not permitted for direct disposal to landfill.

Table 6 - Specific hazard characteristics

Hazard characteristic	Definition
Explosive wastes	An explosive waste is a solid waste (or mixture of wastes) which is in itself capable, by chemical reaction, of producing gas at such a temperature, pressure and speed, as to cause damage to the surroundings. Note: These are wastes classified as 'Class 1' under the provisions of the Road Transport (Dangerous Goods) Act 1995 and/or classified as 'Goods too dangerous to be transported' under the Australian Dangerous Goods Code.



Hazard characteristic	Definition
Flammable soil wastes	Waste solids, other than those classified as explosives, which, under conditions encountered in transport or containment, are readily combustible, or may cause or contribute to fire through friction. Note: These are wastes classified as 'Class 4.1' under the provisions of the Road Transport (Dangerous Goods) Act 1995.
Wastes liable to spontaneous combustion	Wastes which are liable to spontaneous heating under normal conditions encountered in transport, or to heating up in contact with air, and liable to catch fire. Note: These are wastes classified as 'Class 4.2' under the provisions of the Road Transport (Dangerous Goods) Act 1995.
Wastes which, in contact with water, emit flammable gases	Wastes which, by interaction with water, are liable to become spontaneously flammable or to give off flammable gases in dangerous quantities. Note: These are wastes classified as 'Class 4.3' under the provisions of the Road Transport (Dangerous Goods) Act 1995.
Oxidising wastes	Wastes which, while in themselves not necessarily combustible, may, generally by yielding oxygen, cause or contribute to the combustion of other materials. Note: These are wastes classified as 'Class 5.1' under the provisions of the Road Transport (Dangerous Goods) Act 1995.
Organic peroxide wastes	Organic wastes which contain the bivalent-O-O-structure and which are thermally unstable and may undergo exothermic self-accelerating decomposition. Note: These are wastes classified as 'Class 5.2' under the provisions of the Road Transport (Dangerous Goods) Act 1995.
Infectious Waste	Wastes containing viable microorganisms or their toxins which are known or suspected to cause disease in animals or humans. Note: These include clinical and related wastes as prescribed in the Environment Protection (Prescribed Waste) Regulations 1998 and is waste classified as 'Class 6.2' under the provisions of the Road Transport (Dangerous Goods) Act 1995.
Corrosive wastes	Wastes which, by chemical action, will cause severe damage when in contact with living tissue, or in the case of leakage, will materially damage, or even destroy, other goods or the means of transport or containment. They may also cause other hazards. Where corrosivity testing data is not available, pH may be used to determine if the material is Category A.
	 pH value of 2 or less pH value of 12.5 or more Note: This includes wastes classified as 'Class 8' under the provisions of the Road Transport (Dangerous Goods) Act 1995.



Hazard characteristic	Definition
Wastes that liberate toxic	Wastes which, by liberation with air or water, are liable to give off toxic gases
gases in contact with air	in dangerous quantities. Note: These are wastes liable to give off toxic gases
or water	that are classified as 'Class 2.3' under the provisions of the Road Transport
	(Dangerous Goods) Act 1995.

Used Tyres

Landfill disposal of whole tyres is banned, requiring alternative management of this considerable resource.

Conditional Disposal Restrictions

Subject to the conditions defined under regulation for Hazardous Soils and Industrial Waste, there are a number of conditional disposal restrictions that are placed on materials. Ultimately, the landfill licensing conditions define the types of waste legally accepted for disposal at any one site.

The general classifications for landfills in Victoria with regards to hazardous waste are shaped by licensing for disposal of the following materials:

- Drilling mud;
- Firefighting dry chemical powder (DCP);
- Chemical based fibers;
- Absorbent materials;
- Packaging waste; and
- Arsenic and arsenic compounds contained in sand, rock and mine tailings from the City of Greater Bendigo municipality.

A specific license for disposal may be issued by the EPA to an individual company for their waste stream which has been defined as hazardous. This type of classification may be issued when it can be demonstrated that the contaminants are intrinsically or chemically immobilised or when the contaminants present in the waste are not specifically listed.

Asbestos

The disposal of waste asbestos, whether from a workplace or household, is controlled by the Environment Protection Authority Victoria (EPA). Disposal is restricted and must only be at a site licensed by EPA to accept waste asbestos and those licence conditions require waste asbestos to be handled and covered in such a manner that no dust is generated.

Used Tyres

Tyres are considered a solid inert waste from an industrial source. Whole tyres are banned from landfill. Shredded tyres must be disposed of at a site which is licensed to receive shredded tyres.



Clinical waste and related waste

Disposal of untreated clinical waste is banned in Victoria and it must be treated prior to final disposal. The treatment process itself must also be controlled so that it does not lead to other environmental problems. Accepted treatment methods for clinical waste are listed in Appendix B.

Polychlorinated biphenyls (PCBs)

Disposal of solid waste PCBs to landfill (for example, PCB contaminated soil) must only occur where the concentration of the solid is within the limits prescribed in the landfill licence. Landfills are only licensed to accept solid waste with a PCB concentration of 50 mg/kg or less. Solid waste with a PCB concentration greater than this will require treatment at a licensed facility. Disposal of liquid PCBs to landfill is prohibited.

3.6.1 Potential policies in the pipeline

Landfill bans

The PIW classification framework in Victoria aims to support resource recovery and the management of hazardous waste materials in a way consistent with the waste hierarchy, via encouragement of alternatives to landfill disposal. As technologies and markets for materials, both hazardous and not, evolve, the addition of new materials for bans or restrictions may be considered by the government.

PIW classifications for reuse have been adopted for the following material streams:

- 1. Unprocessed used cooking fats and oils;
- 2. End-of-life industrial transformers containing PCB-free oil;
- 3. Grease interceptor trap waste;
- 4. Used oil filters; and
- 5. Large containers.

E-Waste

In early 2015 the newly-elected Andrews Government announced that it would move to introduce a statewide landfill ban on e-waste. In August 2015 the government released a discussion paper for gathering information to help design and implement the proposed e-waste landfill ban. Figure 2 provides a summary of the e-waste ban design and implementation process. The department discussion paper proposes that the implementation stage will commence in early to mid-2017.







The Victorian government is currently working to establish the criteria by which the banned materials and scope will be defined. This includes timing and a staged approach, particularly for those regions that may need additional time to develop the correct infrastructure for processing. The main categories of 'e-waste' considered as part of the ban are wide ranging and include:

- 1. Large appliances (refrigerators, cookers etc.);
- 2. Small appliances (irons, toasters etc.);
- 3. TV equipment, IT and telecommunications (computers, mobile phones, TVs etc.);
- 4. Lighting equipment (fluorescent lamps, LEDs etc.);
- 5. Electrical and electronic tools (drills, saws etc.)
- 6. Toys, leisure and sports equipment (amplifiers, radios, electric cars etc.); and
- 7. 'Other' (medical devices, smoke detectors etc.).

Detox your Home Program

Sustainability Victoria promotes the collection of hazardous household chemicals and has developed a 'Detox your Home' program with councils as a way to manage these hazardous wastes, in lieu of a ban. The chemicals accepted by the program are summarised in Table 7.

Table 7 - Accepted Detox your Home Chemical Materials

Accepted Chemical	
Acids & alkalis	 Aerosol cans (empty cans can be placed in your household recycling bin)
Anti-freeze	Brake fluid
Car body filler	• Car wax
Cleaners - ammonia based	Cooking oil
Coolant	Detergents, disinfectants & drain cleaners
Fertiliser	Fire extinguishers
Floor-care products & waxes	Fuels - petrol, diesel, kerosene, other
Glues - water-based & solvents	Herbicides & weed killers
 Insect spray/pesticides 	Nail polish & remover
Oven cleaner	Paint stripper, thinner & turps
Pool chemicals	Rat poison
Solvents	Transmission fluid
Wood preservatives & finishes (oils	
& varnish)	

Other household hazardous wastes

Sustainability Victoria also funds 30 permanent drop-off centres around the state for household hazardous wastes, in order to promote the correct management and disposal of these household hazardous and problem wastes, in lieu of a ban or disposal restriction. The drop off centres will accept:

- Batteries The Victorian government supports the Australian Battery Recycling Initiative (ABRI) and funds a BatteryBack program with councils;
- Paints; and



• Fluorescent lights.

Product Stewardship

The Victorian government supports the expansion of national and industry product stewardship schemes as a tool to manage the waste materials in lieu of outright landfill bans or conditional disposal restrictions. Product stewardship programs supported by the Victorian government include:

- Used tyres National Tyre Product Stewardship Scheme, 2014;
- Used oil Federal government Product Stewardship for Oil Program, 2001;
- Televisions and computers National Television and Computer Recycling Scheme;
- Mobile phones Mobile Muster;
- Agvet chemical containers:
 - drumMUSTER collects and recycles used containers for crop production and on-farm animal health chemicals; and
 - ChemClear collects and disposes of unwanted crop production and veterinary chemicals.

3.7 Tasmania

Introduction

The power of the EPA to protect the environment in Tasmania is specified in the relevant provisions of the *Environmental Management and Pollution Control Act 1994.*

Materials that exhibit toxicity, chemical or biological reactivity, environmental persistence or the ability to bio-accumulate in the food chain are referred to as *Controlled Waste* in Tasmania. These wastes need to be carefully controlled and managed in their use, production, transport and disposal due to their potential impact on human health and the environment. *Controlled waste* also refers to other waste, such as tyres, that are not specifically hazardous but need special management prior to disposal. These wastes are defined in *Environmental Management and Pollution Control Act 1994* and the Environmental Management and Pollution Control (waste management) Regulations 2010.

Controlled wastes are listed in Schedule A of the *Controlled Waste NEPM* and must contain one or more of the characteristics in list 3. The waste classification codes of controlled waste in Tasmania are based on list 1, Schedule A of the *Controlled Waste NEPM* but also include additional wastes prescribed in the Regulations.

Tasmania does not currently have a high-end hazardous waste landfill. However, a development application for a hazardous waste landfill cell at Copping landfill (owned by local government but operated by a private authority) has been approved. This development may change the management of hazardous waste in Tasmania, with a move from outright bans to conditional disposal of certain materials at the Copping landfill.

Hazardous Waste Bans

Clinical and related waste

The clinical and related waste stream includes discarded sharps, infectious or potentially infectious waste, cytotoxic drugs, pharmaceutical and radioactive materials. The *Approved Management Method for Clinical and Related Waste* guideline was developed in 2008 and details the minimum standards and recommended



controls in relation to different factors including disposal of these wastes. A key feature of the guidelines is a ban on landfilling untreated clinical and related wastes which took effect on 1st October 2008.

Most wastes must undergo treatment prior to disposal, with the exception of Cytotoxic Waste that must only be disposed of by high temperature incineration and not landfill.

Conditional Disposal Restrictions

Contaminated soil

The Tasmanian EPA uses 4 categories to classify contaminated soil. These are:

- 1. Level 1 Fill Material;
- 2. Level 2 Low Level Contaminated Soil;
- 3. Level 3 Contaminated Soil; and
- 4. Level 4 Contaminated Soil for Remediation.

Contaminated soil may be classified as a controlled waste subject to the contamination levels, as prescribed in the Regulations. All soil and other material reasonably suspected to be a controlled waste must be sampled and analysed by the waste producer to determine whether it is a controlled waste before that waste can be removed from the site.

Classification of the soil will determine whether it is subject to a ban or conditional disposal restriction. A Waste Management Plan must be developed to outline its treatment or disposal based on the Regulations for that classification.

Table 8 below outlines the acceptable disposal and conditional disposal restrictions for different levels of waste soil in Tasmania.

Waste type	Category A landfill – Solid Inert	Category B landfill – Putrescible Landfill	Category C landfill – Secure Landfill
Level 1 – Fill Material	Yes	Yes	Yes
Level 2 – Low Level Contaminated Soil	No	Yes	Yes
Level 3 – Contaminated Soil	No	No	Yes
Level 4 – Contaminated Soil for Remediation	No	No	No

Table 8 - Soil disposal in Tasmania

Tyres

Waste tyres, including all tyres generated from the public, commercial, transport and industrial use are banned from landfill without processing in Tasmania. Currently only a third of tyres produced are processed to go to landfill, leading to large stockpiles.



Potential policies in the pipeline

There are no current policies in the pipeline, but State-wide targets are in development which will likely include targets to reduce the impact of wastes on human health and the environment, which may include targets to reduce hazardous waste disposal at landfill. This may lead to further bans on hazardous waste disposal.



3.8 Queensland

Introduction

Queensland is considering a number of landfill bans as a possible tool to increase resource recovery due to the lack of price signal for landfill diversion (levy). Queensland is therefore motivated by slightly different drivers to implement a landfill disposal ban for hazardous and non-hazardous waste than the rest of the country.

Currently the government is looking at advancing the work started with the Landfill Bans Feasibility Study undertaken in 2014⁴. The study sought to:

- understand how landfill disposal bans could help support the implementation of the draft waste strategy;
- identify a short list of materials that would practically and feasibly benefit from a landfill disposal ban;
- conduct a market analysis of the price and recovery trends for the targeted wastes, existing industry capacity, and the market for the recovered materials;
- undertake a high-level cost-benefit analysis on the impacts of introducing landfill disposal bans for the short listed materials; and
- provide recommendations for implementation, including design attributes, implementation lead times, investment requirements, scope and suitability of complementary measures and market development opportunities.

The initial scoping of materials for a potential landfill disposal ban included the following materials:

- 1. concrete;
- 2. tyres (car and light passenger vehicle);
- 3. televisions and computers;
- 4. batteries (used lead acid batteries);
- 5. agricultural and veterinary chemical containers;
- 6. oil, oil filters and containers;
- 7. metals;
- 8. timber; and
- 9. MSW green (household kerbside and drop-off).

Following industry consultation, the following additional materials were identified as potential materials to be considered for a landfill disposal ban, either in the initial analysis or at a later date:

- 1. gyprock;
- 2. expanded polystyrene (EPS);
- 3. commercial and industrial (C&I) mixed loads;
- 4. construction and demolition (C&D) mixed loads;
- 5. all agricultural plastics;
- 6. commercial e-waste;

⁴ https://www.ehp.qld.gov.au/waste/landfill-disposal-bans.html

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- 7. mattresses; and
- 8. paint.

The key success factors identified for the implementation of a landfill disposal bans included:

- 1. cost trade-off;
- 2. national product stewardship scheme;
- 3. market for reuse materials and recovery rates; and
- 4. major facilities processing targeted materials.

Based on the review, the following materials were identified as suitable materials for further assessment for landfill banning:

- 1. concrete (sorted) South East and North East regions;
- 2. concrete (mixed) South East and North East regions;
- 3. tyres (passenger and small heavy vehicles) all regions; and
- 4. timber (mixed) South East and North East regions
- 5. metals South East and North East regions;
- 6. MSW green (kerbside and drop-off) South East and North East regions; and
- 7. MSW green (all) South East and North East regions

Collectively these waste streams represent approximately 38% of total waste currently going to landfill in Queensland.

Based on the analysis, there is sufficient capacity within the sorted concrete and tyre recycling markets to accept and process the additional tonnes likely to enter the market should a landfill disposal ban be implemented. However, additional capacity would be required to process the additional tonnes of MSW green material.

Waste and Hazardous Waste Bans

Section 13 of the QLD Environmental Protection Act 1994 defers to the QLD Waste Reduction and Recycling Act 2011. Chapter 4, Part 4 of the Act provides the structure for the implementation of disposal bans.

The regulations and associated Schedule 7 define the materials that have been identified. Table 9 summarises the required treatment and disposal options defined for clinical and related waste.



Waste type	Incineration	Auto- claving and shredding	Chemical disinfection using hydro chlorite and shredding	Chemical disinfection on using peroxide, lime and shredding	Microwave and shredding	Compaction	Landfill
Chemical	Yes (if licenced)	No	No	No	No	No	No
Cytotoxic	Yes	No	No	No	No	No	No
Human body parts	Yes	No	No	Yes	No	No	No
Pharmaceuticals	Yes	No	No	No	No	No	No
Treated clinical	-	-	-	-	-	Yes	Yes
Untreated clinical	Yes	Yes	Yes	Yes	Yes	Yes (other than animal carcasses and sharps)	No (other than in a scheduled area)

Table 9 - Schedule 7B: Treatment and disposal of clinical and related waste in Queensland

Schedule 7C defines the geographical regions and waste types covered by the QLD Disposal ban. Table 10 provides a summary of the relevant waste types.

Table	10 -	Schedule	7C:	Waste	disposal	bans	in	Oueensl	and
TUNIC	10	Schedule	<i>.</i>	vvuste	aisposai	Suns		Queensi	unu

Part of State	Type of Waste	Effective date
Entire State	 liquid PCB waste related waste waste that is scheduled PCB material 	1 September 2014
Entire state, other than a scheduled area	untreated clinical waste	1 September 2014



Conditional Disposal Restrictions

Asbestos⁵

Asbestos waste is a regulated waste and subject to a conditional disposal restriction as it must be disposed of at a landfill site that can lawfully receive it. Asbestos waste for disposal must be double-wrapped in 0.2 mm thick plastic bags or sheeting, sealed with tape and labelled double wrapped and transported to a landfill site that accepts asbestos. There are also laws surrounding the transport of asbestos.

Clinical and Related Waste

All untreated clinical or related waste is banned from disposal at landfill, except clinical waste that has been generated in a scheduled area⁶. Untreated clinical waste generated in a scheduled area may be disposed of to landfill in that area, under supervised burial conditions.

Clinical or related waste not generated in a scheduled area must be treated by one of the following methods, as opposed to landfill:

- 1. incineration;
- 2. autoclaving and shredding;
- 3. chemical disinfection using hypochlorite, and shredding;
- 4. chemical disinfection using peroxide and lime, and shredding; or
- 5. microwave disinfection and shredding.

Compaction in landfill of human body parts, animal carcasses, cytotoxic waste, chemical waste, radioactive waste, pharmaceutical waste and sharps is not considered appropriate disposal.

Chemical waste

Chemical waste such as formaldehyde and glutaraldehyde (used as a steriliser in dentistry and medicine) must be treated appropriately before being disposed of in landfill. Some chemicals are suitable for incineration, while others will need to be neutralised or fixed so that they cannot leach into the environment.

Cytotoxic waste

Cytotoxic waste must be treated before it can be disposed of in landfill. Because of the potential risk associated with exposure to cytotoxic waste, the only appropriate treatment method that can currently be used is incineration.

Human body parts

Human body parts must be incinerated or treated by chemical disinfection processes using hydrogen peroxide and lime, and shredded before disposal to landfill. Hypochlorite, lime and bentonite are used to render the waste non-infectious, followed by a shredding process which makes the waste unrecognisable. Other treatment technologies such as autoclaving and chemical disinfection alone are not currently acceptable methods for treating human body parts.

⁵ <u>http://www.deir.qld.gov.au/asbestos/law/transport-disposal.htm</u>

⁶ As defined in Schedule 4 of the Environmental Protection Regulation 2008



Pharmaceutical waste

Pharmaceutical waste is banned from direct disposal at landfill and must be incinerated. Once incinerated the ash may be disposed of at an appropriately licensed facility.

Radioactive waste

Radioactive waste must be managed under the requirements of the *Radiation Safety Act 1999*. Under that Act, a person must not dispose of radioactive material unless:

- 1. the concentration or activity of a radionuclide in the material is not more than the maximum concentration or activity prescribed under a regulation; or
- 2. the person is the holder of an approval to dispose of the material and disposes of it as required under the approval.

If deemed low level radioactive waste, the waste can be disposed of at an appropriately licensed repository.

Potential policies in the pipeline

The landfill material bans introduced by the QLD government in 2014 were the first to be introduced by the state. The materials currently subject to the ban are detailed in Table 10.

Product Stewardship

As well as considering hazardous and non-hazardous materials for landfill bans, the QLD government supports the expansion of national and industry product stewardship schemes, as interacting and/or additional market tools for the management of hazardous and problem waste. This includes:

- 1. Used tyres National Tyre Product Stewardship Scheme, 2014;
- 2. Used oil Federal government Product Stewardship for Oil Program, 2001;
- 3. Televisions and computers National Television and Computer Recycling Scheme;
- 4. Mobile phones Mobile Muster;
- 5. Agvet chemical containers:
- a. drumMUSTER collects and recycles used containers for crop production and on-farm animal health chemicals; and
- b. ChemClear collects and disposes of unwanted crop production and veterinary chemicals.
- 6. Batteries The QLD government has funded funding the pilot program for the recycling of power tool batteries program as part of the Australian Battery Recycling Initiative (ABRI); and
- 7. Fluorescent lights The department is a signatory to the FluoroCycle scheme, a voluntary national product stewardship scheme for mercury-containing lamps.



3.9 Western Australia

Introduction

Disposal of waste in Western Australia (WA) is governed as per the *Landfill Waste Classifications and Waste Definitions 1996 (as amended December 2009).* There are five classifications of landfill in WA:

- 1. Class 1 Inert Landfill;
- 2. Class II Putrescible Landfill (accepts some controlled waste);
- 3. Class III Putrescible Landfill;
- 4. Class IV Secure Landfill; and
- 5. Class V Intractable Landfill

The Department of Environment Regulation (DER) regulates the transportation of controlled waste on roads in Western Australia.

Hazardous Waste Bans

Tyres

Used tyres are classified in Western Australia as hazardous waste due to the potential discharges and emissions from tyre fires. The storage, handling, transportation and disposal of used tyres are specifically controlled under the *Environmental Protection Regulations 1987* (Part 6, Schedule 1 and Schedule 5) Environmental Protection (Controlled Waste) Regulations 2004 and the *Environmental Protection Act 1986* and the *Waste Avoidance and Resource Recovery Act 2007*.

Disposal of tyres is partially restricted in Western Australia within the 'Tyre Landfill Exclusion Zone' as follows:

- 1. Part 1 Metropolitan (Perth);
- 2. Part 2 Country (area immediately surround Perth)

Disposal of tyres is permitted outside of the zone but only within landfills that have minimum cover and adequate separation distances between batches to minimize fire risks. Disposal within the exclusion zone is permitted only with previous written approval by the Chief Executive Officer of the Department of Environment Regulation.

The Environment Protection Regulations 1997 also allows for:

- 1. Disposal by incineration; or
- 2. Other disposal options.

Conditional Disposal Restrictions

There are a number of waste types that are hazardous by virtue of their properties and are therefore subject to conditional disposal restrictions for treatment prior to disposal or are only allowed for disposal in certain landfill classes.

Intractable Waste

Intractable waste is waste that is a management problem due to its toxicity or chemical characteristics. If there is not a practical alternative destruction or treatment technology, then these are disposed of in Class V facilities. For example:



- 1. Radioactive Wastes; and
- 2. Significantly contaminated soils.

Asbestos

Asbestos waste that is regarded as hazardous may be only disposed of with special management techniques and in appropriately licensed facilities.

Biomedical wastes

Some biomedical waste is only liable for incineration and supervised burial in Class V landfill.

Potential policies in the pipeline

There are no current policies for hazardous waste bans in the pipeline.



3.10 Northern Territory

The Waste Management and Pollution Control Act 2007 is the main legislation regarding waste disposal in the Northern Territory.

Hazardous wastes identified by the Act are:

- 1. Car batteries;
- 2. Waste oil;
- 3. Clinical waste;
- 4. Paints and solvents;
- 5. Building Materials;
- 6. Car tyres;
- 7. Fridges and Freezers;
- 8. Lockable boxes; and
- 9. Animal carcasses.

Hazardous Waste Bans

Clinical waste

Clinical waste that includes the following must not be disposed of at landfill but at an appropriate incinerator facility:

- 1. Discarded sharps;
- 2. Human tissue;
- 3. A vessel or bag containing a liquid body substance;
- 4. An animal carcass discarded in the course of veterinary research;
- 5. A specimen or culture discarded in the course of medical, dental or veterinary practice;
- 6. Heavily bloodstained bandages and dressings;
- 7. Cytotoxic waste; and
- 8. Pharmaceuticals.

Prohibited and other special wastes

Chemical drums can be triple rinsed and recycled through the DrumMuster and ChemClear programs throughout the NT, but any pesticides and pesticide containers which have not been cleaned in accordance with *Agsafe Standard for Effective Rinsing of Farm Chemicals* and commercial quantities of hazardous waste and Radioactive Waste are not permitted for disposal in small communities. Any of these materials prohibited for disposal must be transported out of the community by a licensed contractor and disposed of in an appropriately licensed facility.

Conditional Disposal Restrictions

Asbestos

No asbestos is permitted for disposal outside of a licensed landfill site; all asbestos must be removed by licensed contractors. Contractors undertaking demolition in the community must remove asbestos as part of their contract and dispose at appropriately licensed facilities. There are a limited number of disposal sites in



the Territory, particularly for those living in remote and rural communities. Therefore, a secondary option for management of asbestos is to use on-site containment vessels and temporary storage solutions.

Potential policies in the pipeline

Car batteries

A car battery buy-back scheme is in operation through the Automobile Association of the Northern Territory and there may be scope for the government to expand this scheme in lieu of a ban or restrictions. There are approximately twenty private and council operators who receive batteries for reconditioning and /or recycling. For example, the Association has partnered with battery service centres and auto centres to provide collection of used lead acid batteries and the Shoal Bay Waste Management Facility of the City of Darwin offers battery collection at their recycling shop.

Draft Waste Management Strategy

In November 2014, the Northern Territory released its first Draft Waste Management Strategy. Within the Strategy there are a number of hazardous waste types that have been earmarked for further policy development or expansion. These include:

- 1. Asbestos;
- 2. Clinical Waste;
- 3. Batteries (single-use and Lithium Ion); and
- 4. Paints and solvents.



4. Hazardous Waste Landfill Bans in other jurisdictions

There are a number of hazardous waste bans/restrictions in place in international jurisdictions including Europe and North America, driven by rigorous regulation to increase resource recovery as well as to protect human health, which make the bans far further reaching than those currently in place in Australia. Most materials banned in different States and Territories in Australia are echoed through landfill bans in Europe and the United States. Countries such as Germany, have regulated bans to landfill as a tool to increase recycling and recovery of all recoverable or recyclable materials. By driving resource recovery as well as protecting human and environmental health, bans such as these are far greater reaching. The following details those related to hazardous waste or household hazardous waste materials only.

4.1 European Union

Under Council Directive 1999/31/EC, from the 26 April 1999, all countries in the European Union banned the following materials from landfill disposal:

- 1. Whole (from 2003) and shredded (from 2006) tyres;
- 2. Liquid wastes;
- 3. Wastes which are explosive, corrosive, oxidizing, flammable or infectious; and
- 4. All wastes that have not been pre-treated.

4.2 Belgium

From 2004 to 2010 Belgium introduced a series of landfill bans for hazardous and non-hazardous wastes. In 2004 the following hazardous waste materials were banned from landfill:

- 1. Liquid wastes;
- 2. Hazardous wastes;
- 3. Class B and B2 hospital wastes;
- 4. Spent batteries; and
- 5. Medication waste.

In 2006, the government developed these bans further to include:

- 1. Shredded tyres; and
- 2. End of Life Vehicles.

Then in 2007 the following were banned:

- 1. All e-waste; and
- 2. Slags and drosses from metal production.
- In 2008, the following wastes were also banned:
 - 1. Dust from steelworks and blast furnaces; and
 - 2. Class A hospital wastes.



4.3 Germany

In Germany, *The Ordinance on Waste Recovery and Disposal Records* (of 2002, as amended) governs monitoring and supervision of hazardous waste recovery and disposal.

As of 2001, Germany has implemented a countrywide ban on the following materials from landfills:

- Any municipal waste that can be recovered
- Untreated municipal waste
- All biodegradable municipal waste to be separately collected and composted
- Waste wood.

In Federal States that impose delivery and handover obligations for hazardous waste, the waste-generating entity is required to notify to local authorities of:

(a) The type, quantity and composition of the waste in question; and

(b) The envisaged disposal facility.

The authorities then assign the waste to a suitable facility. Disposal techniques can vary greatly from one type of waste to another, as can the applicable regulations. This also applies to the disposal of waste containing hazardous substances such as asbestos or persistent organic pollutants (POPs). The Landfill Ordinance sets high standards for landfill sites. It also requires extremely hazardous waste to be disposed of below ground in deep salt mines.

Currently there are 56 Class III landfill sites for hazardous waste in Germany, with many other landfill sites suited for conditional disposal of certain hazardous wastes.

The motivation behind these bans and restrictions are as follows⁷:

- To reduce the environmental impact of landfill
- Increase material recovery
- Preserve natural resources
- Promote a shift in waste management to a higher level in the waste hierarchy
- Promote upstream changes in material use
- Shift waste management from landfill to incineration (similar to recovering energy from waste)

Oil

Waste oils are banned from landfill and are not permitted for mixing with other wastes or with different categories. It is up to the owner of the recovery facility that has purchased the waste oil to decide how it will be used, since this depends on the different operating processes at different facilities. The basis for this is that the facility holds a permit for harm free and proper recovery under Germany's environmental quality legislation, the *Bundesimmissionsschutzgesetz* or "*Federal Emission Control Act.*" This means that during the management of the waste oil very different products are accepted and processed. To make it possible to undertake a more differentiated classification, the waste oils accepted must first undergo comprehensive analytical assessment. Analysis of the prescribed parameters for PCB and total chlorine content are of particular significance here.

⁷ Hyder Report, 2010

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Waste oils for which regeneration is not appropriate due to high concentrations of additives or harmful substances may be recovered for energy purposes as a replacement for normal fuel in combustion installations that have a permit as stipulated under the "Federal Emission Control Act" to use energy-rich wastes.

Diversion

In Germany, landfill operators are not allowed to accept waste that does not meet stipulated standards. Each load of waste must be accompanied by documentation certifying compliance with appropriate criteria, and visually inspected. If the waste does not meet the criteria, it will be stored on site and the authorities contacted.

Through a series of regulatory tools, including hazardous and non-hazardous waste disposal bans, Germany achieved a 96% reduction of waste to landfill over a period of 6 years. This was accompanied by a 9 per cent increase in incineration and a 25 per cent increase in materials recovery⁸ (Germany enforces their landfill bans through producer responsibility measures, mandatory separate collections, and 'pay-as-you-throw' variable charging.

In addition, the European chemicals legislation (REACH) and provisions on the content of hazardous substances in electrical and electronic equipment have led to reductions in hazardous waste.

4.4 United States of America

The US EPA regulates hazardous waste under the *Resource Conservation and Recovery Act (RCRA)*, which includes strict regulations for treatment, storage and disposal of hazardous waste. In certain cases, states have implemented tougher requirements than Federal obligations.

Common hazardous wastes in the United States include:9

- Waste oil;
- Solvents and thinners;
- Acids and bases/alkalis;
- Toxic or flammable paint wastes;
- Nitrates, perchlorates and peroxides;
- Abandoned or used pesticides;
- Wastewater treatment sludge; and
- Special hazardous waste:
 - o Industrial wastes containing the USEPA priority pollutants
 - o Infectious medical wastes
 - Explosive military wastes
 - Radioactive wastes or releases.

⁸ Umwelt Bundesamt, 2015.

⁹ L.K. Wang, *Hazardous Waste Management: A United States Perspective*, UNIDO, Vienna, Australia, 2000



Statewide

In the United States, forty-seven states have at least one disposal ban for either hazardous or non-hazardous waste. Table 11 provides a summary of the disposal bans in each state.

Table 11 - List of USA states with dispo	sal ban (s) for one or more materials ¹⁰
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	Disposal Ban(s)	Mandatory Recycling of at least one commodity	Bottle Bill
Alabama	Yes	No	
Alaska	Yes	No	
Arizona	No	No	
Arkansas	Yes	No	
California	Yes	Yes	Yes
Colorado .	Yes	No	
Connecticut	Yes	Yes	Yes
District of Columbia (DC)	Yes	Yes	
Delaware.	Yes	No	
Florida	Yes	No	
Georgia	Yes	Yes	
Hawaii	Yes	No	Yes
Idaho	Yes	Yes	
Illinois	Yes	Yes	
Indiana	Yes	Yes	
lowa	Yes	Yes	Yes
Kansas	Yes	No	
Kentucky	Yes	No	
Louisiana	Yes	No	
Maine	Yes	Yes	Yes
Maryland	Yes	No	
Massachusetts	Yes	No	Yes
Michigan	Yes	No	Yes
Minnesota	Yes	Yes	
Mississippi	Yes	No	
Missouri	Yes	No	
Montana	No	No	
Nebraska	Yes	No	
Nevada	Yes	No	

¹⁰ United States Environment Protection Authority, 2015.



	Disposal Ban(s)	Mandatory Recycling of at least one commodity	Bottle Bill
New Hampshire	Yes	No	
New Jersey	Yes	Yes	
New Mexico	Yes	Yes	
New York	Yes	No	Yes
North Carolina	Yes	No	
North Dakota	Yes	Yes	
Ohio	Yes	Yes	
Oklahoma	Not reporting	Not reporting	
Oregon	Yes	No	yes
Pennsylvania	Yes	Yes	
Rhode Island	Yes	Yes	
South Carolina	Yes	No	
South Dakota	Yes	Yes	
Tennessee	Yes	No	
Texas	Yes	No	
Utah	Yes	No	
Vermont	Yes	No	yes
Virginia	Yes	Yes	
Washington	Yes	Yes	
West Virginia	Yes	No	
Wisconsin	Yes	Yes	
Wyoming	No	No	

The hazardous materials most commonly banned from landfill in the United States are:

- 1. Lead acid batteries
- 2. Waste oil
- 3. Tyres (38 states have banned whole tyres and 11 states have banned all tyres)
- 4. Untreated infectious waste
- 5. CRTs
- 6. Mercury containing products
- 7. Liquid waste
- 8. Computers
- 9. Nickel-Cadmium batteries.

A number of individual states in the USA have banned a number of hazardous wastes from landfill as follows.



Massachusetts

Massachusetts implemented state-wide bans of the following materials, between 1991 and 2006:

- 1. Lead batteries;
- 2. Tyres;
- 3. Whitegoods;
- 4. Cathode ray-tubes.

North Carolina

North Carolina bans the following hazardous waste from landfill:

- 1. Used oil;
- 2. Antifreeze;
- 3. Whole tyres;
- 4. Lead acid batteries;
- 5. Oil filters; and
- 6. Televisions and computers.

Oregon

Oregon has landfill bans for the following materials:

- 1. Used oil;
- 2. Tyres;
- 3. Lead Acid Batteries; and
- 4. Covered electronic Devices.



5. Ban Architecture

This chapter presents the results of Stakeholder Consultation and analysis in order to recommend a 'model approach' for harmonisation of regulation and product stewardship in different States and Territories to achieve positive outcomes for hazardous waste control.

5.1 Research method

5.2 Stakeholder workshop

A workshop to 'brain storm' hazardous waste management and its interaction with product stewardship was conducted on January 27th 2016 at MRA's office, Suite 409, 19 Roseby Street, Drummoyne NSW 2041 and was also available via teleconference. Stakeholders were identified as those that had a stake or interest in the issues as well as those that are influential in the policy area or were critical to delivery. Invited representatives from State Government, Federal Government and Industry attended the workshop either in person or via teleconference, see 0 for a list of full participants and workshop outcomes.

This stakeholder feedback was first collated in order to define problems and identify the issues highlighted by stakeholders. This feedback was analysed to identify the key challenges and opportunities in order to explore possible policy responses. These responses to develop the model approach outlined below.

5.3 An approach to improve harmonisation

The approach described in the following sections aims to improve harmonisation between Bans, Restrictions and Product Stewardship through a pragmatic approach that supports the development of a detailed perspective of the relationship between the technical and policy requirements. In particular, the approach aims to integrate the disparate activities of the different States and Territories within a formal framework that uses this information to plan for the future.

The approach has been designed using an intuitive flowchart format that flows through a series of 'building block' processes that can be rearranged manually and can be repeated and refined through an iterative process, until all parties are satisfied that the planned activities have been completed to a satisfactory level.

The key themes from the Stakeholder Consultation to be considered when drafting a 'model approach' for discussion are outlined in sections 6.4 to 6.10 below.

5.4 Objectives

The use of Product Stewardship, Bans and Restrictions as mechanisms to control disposal of hazardous waste must have clear objectives from the outset. There are times when a Ban or a de facto ban (due to the lack of an appropriately licensed facility) may be sufficient to control the end-of-life destination of a material or substance, but this may not be sufficient to drive the desired objective, which may be to ensure the generators of these materials or substances take responsibility and look for market alternatives. Ensuring objectives are clearly stated from the beginning will ensure the most effective harmonisation of legislative and policy tools.



5.5 Scale

In order for Bans or Restrictions to be effective both with and without Product Stewardship they must be National in scale or the distance to another disposal point must be sufficient to provide a disincentive for transport. For example, South Australia has been effective in its implementation of landfill bans for many substances due to the fact that the distances to the next nearest receptor are a sufficient barrier to travel. However, this may not be the case for many of the Eastern States in particular, as shown by the recent examples of urban waste travelling from NSW to Queensland for landfill disposal (prior to the legislated 'proximity rule'). Ideally the Federal Government needs to act to coordinate State legislative processes in order to reduce the risk of 'leakage' to other States.

Geographical factors must also be taken into account when planning and executing partial or total Bans. Bans and Product Stewardship must take geographical distances to appropriate processing technology into account and must appreciate the difficulties faced by Rural locations, particularly in Western Australia and the Northern Territory.

5.6 Role of the Federal Government

The consultation highlighted the need for a coordinated approach between all jurisdictions in which the Federal Government would assist States and Territories to implement Bans and Restrictions alongside Product Stewardship. The Federal Government could provide a Federal position through the update and development of hazardous waste definitions in the National Waste Policy as well as to act as a central negotiator to assist States and Territories in implementing the Bans, Restrictions and Product Stewardship Schemes.

This would be in addition to the Federal Government's normal role in evaluating the impact of regulatory changes when required.

5.7 Monitoring and Evaluation

Monitoring and evaluation criteria to monitor the effectiveness of Bans, Restrictions and Product Stewardship Schemes must be clearly defined from the beginning to ensure that the success of the process can be assessed. A clear set of robust and measurable KPI's must be agreed between all parties from the outset.

5.8 Research and consultation

Prior to the introduction of either Product Stewardship or coordinated Bans there needs to be sufficient time, at least one year, to research the current processing capacity and the gaps for processing technologies for highlighted hazardous wastes. There also needs to be sufficient time to consult with industry, so as not to alienate key stakeholders who would otherwise add to the ultimate success. It was also noted that processors need assurance of quantities of materials prior to investing in capital infrastructure.



5.9 Timing

Sufficient time for industry to plan, construct and commission additional processing capacity must be taken into account. The process can take between 2 and 4 years depending on approvals processes. Consideration must also be given to 'partial' and 'phased' bans that allow time for industry to adapt.

5.10 Education

Education of the community and industry was considered key to the success of landfill bans in South Australia. Adequate timing for education of all community stakeholders must be considered.

The draft model approach is detailed in 0.



6. Conclusions

Generally, most hazardous wastes are managed through conditional disposal restrictions that require pretreatment prior to disposal at landfill, for example asbestos, medical and related wastes, Polychlorinated biphenyls and Organochlorine Pesticides. Tyres are banned either state wide or geographically segregated in South Australia, Western Australia, Tasmania and NSW. E-waste is banned in South Australia and considered for banning in Victoria and computers and televisions are banned in Australian Capital Territory (ACT). Liquid waste is effectively banned in ACT as there is no licensed facility to accept liquid waste in the jurisdiction and is outright banned in South Australia. South Australia also bans lead acid batteries which are also in the pipeline for banning in Victoria and are geographically banned (from small communities) in Northern Territory.

South Australia also bans vehicles, white goods, fluorescent lighting and some paint from landfill. Fluorescent lighting is also in consideration for a landfill disposal ban in Victoria and Queensland. Most states have conditional disposal restrictions for hazardous waste that may exhibit any of the characteristics of Schedule A waste, which often includes materials such as Spent Pot Linings and Spent Catalyst, dependent on their level of contamination. Radioactive waste is banned from landfill in Queensland, geographically banned in Northern Territory (small communities) and is subject to conditional disposal restrictions in NSW. Generally, travel distances, and the need for safe travel, from generators to processors is one of the factors inhibiting the implementation of further landfill bans for hazardous waste disposal, as demonstrated in the Northern Territory with asbestos. This is especially the case for denser/restricted materials which are not economically viable or safe to transport to suitable processors. Such materials can be recycled in the metropolitan centres where handlers/processors are situated close to generators and markets, but are not readily processed/handled in rural areas where there are very few processors. Landfill bans would therefore require investments in rural infrastructure to reduce the financial burden to those generating hazardous materials.

However, the far-reaching international experience and examples demonstrate that landfill bans can be one tool to assist to reduce hazardous waste to landfill and manage consumer's use of hazardous and non-hazardous wastes. There is therefore potential for Australia, with the right approach, to implement further, more diverse landfill bans for hazardous materials.

Hazardous wastes banned, restricted or considered for product stewardship are listed by jurisdiction in Table 12. The table distinguishes those materials banned outright, those banned by de facto (i.e. there is no facility licensed to accept such wastes), those which are banned geographically (i.e. those which are accepted for landfill in metropolitan or rural regions only), those which have a conditional disposal restriction in place (i.e. must be processed or treated prior to disposal), those which are in the pipeline for a form of ban and those which are currently being considered under state wide product stewardship schemes.

Product Stewardship and landfill bans should work together in mutual support. Product stewardship schemes require the establishment of processing infrastructure to recover and manage hazardous materials, while landfill bans prohibit the cheaper alternative and thereby assist in ensuring the requisite supply of feed material for processing is available. This in turn supports the financial viability of the processing infrastructure. Announcing product stewardship schemes and landfill disposal bans together, but phasing them sequentially, enables the responsible jurisdiction to provide a definitive date for a ban to take effect, while ensuring the necessary infrastructure for alternative treatment is in place.



Waste	ACT	SA	Vic	Tas	Qld	WA	NT	NSW
Waste with Schedule A								
PCBs								
OCPs								
Asbestos								
Contaminated soil/rock								
Computers & Televisions								
All e-Waste								
Sharps								
Clinical								
Human Tissue								
Human body parts								
Cytotoxic								
Pharmaceuticals								
Chemical								
Liquid Waste								
Lead Acid Batteries								
Tyres								
Vehicles								
White Goods								
Fluorescent lighting								
Paint								
Oils								
Mobile Phones								
Agvet Chemical Containers								
Radioactive Wastes								

Table 12 - Materials banned, restricted or considered for Product Stewardship by jurisdiction

Кеу				
Banned				
de Facto Ban				
Geographical Ban				
Conditional Disposal Restriction				
In the Pipeline				
Considered for PS				



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Zero Waste South Australia

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Appendix A Victorian Soil Hazardous Characteristics

Category		Fill Material upper limits		Category C upper limits			Category B upper limits			
				<	$\langle = \rangle$		$\langle \rangle$		\rightarrow	
	!		1							· · ·
Contaminant concentration thresholds (dry weight)	Į		TCO		ASLP1 ¹	TCI		ASLP21	TC2	
Units			(mg/kg)		(mg/L)	(mg/kg)		(mg/L)	(mg/kg)	
Inorganic species	Ì	Inorgani	ic species		Inorganic	species		Inorgani	c species	
Arsenic			20		0.7	500		2.8	2,000	
Cadmium			3		0.2	100		0.8	400	
Chromium (VI)			1		5	500		20	2,000	
Copper			100		200	5,000		800	20,000	
Lead			300		1	1,500		4	6,000	
Mercury			1	С	0.1	75	С	0.4	300	С
Molybdenum			40	A	5	1000	A	20	4,000	Å
Nickel			60	Ė	2	3,000	È	8	12,000	÷
Tin			50	G	-	500	G			G
Selenium			10	0	1	50	0	4	200	0
Silver			10	R	10	180	R	40	720	R
Zinc			200		300	35,000		1,200	140,000	
Anions		An	ions	с	Anions		в	Anions		A
Cyanide	F		50		8	2,500		32	10,000	
Fluoride	11		450	C	150	10,000	C	600	40,000	C
Organic species	L	Organia	species	N	Organic	species	N	Organic	species	N
Phenols (halogenated) ²			1	T	2	10	T	8	320	T
Phenols (non-halogenated) ³	M		60	A	14	560	A	56	2,200	A
Monocyclic aromatic hydrocarbons ⁴	Ť		7	M	-	70	M	-	240	M
Benzene	E		1	Ň	0.1	4	N	0.4	16	
Polycyclic aromatic hydrocarbons ⁵	R		20	A	-	100	A	-	400	Å
Benzo(a) pyrene			1	T	0.001	5	T	0.004	20	Т
C6-C9 petroleum hydrocarbons	ĩ		100	E	- 1	650	E	-	2,600	E
C10-C36 petroleum hydrocarbons			1,000		1.5	10,000		~	40,000	
Polychlorinated biphenyls ⁶			2	s	see no	te 6	S	see n	ote 6	S
Chlorinated hydrocarbons ⁷			1	0			0			0
Hexachlorobutadiene					0.07	2.8		0.28	1	
Vinyl chloride	1			-	0.03	12	-	0.12	4.8	
Other chlorinated hydrocarbons ⁸]				-	10		-	50	
Pesticides		Pest	icides		Pesti	tides		Pest	icides	
Organochlorine pesticides ⁹			1							
Aldrin + dieldrin					0.03	12		012	4.8	
DDT + DDD + DDE					2	50		-	50	
Chlordane					0.1	4		0.4	16	
Heptachlor					0.03	12		0.12	4.8	
Other organochlorine pesticides ¹⁰					-	10		-	50	



Appendix B Summary of treatment processes for clinical waste in Victoria

Waste type	Incineration	Autoclave without shredding	Autoclaving & shredding	Hypochlorite & shredding	Peroxide, Lime & shredding	Microwave/ shredding
Sharps	Y	Ν	Y	Y	Y	Y
Clinical	Y	Y	Y	Y	Y	Y
Human tissue	Y	Ν	Ν	Ν	Ν	Ν
Recognisable anatomical body parts	Y	Ν	Ν	Ν	Ν	Ν
Cytotoxic	Y	Ν	Ν	Ν	Ν	Ν
Pharmaceutical	Y	Ν	Ν	Ν	Ν	Ν
Chemical	Ν	N	N	Ν	N	N ¹¹

Appendix C Lithium Ion Batteries

Lithium Ion Batteries

Lithium Ion battery consumption is growing in Australia. Many of these at the household level are embedded within mobile phones and other electrical items. An estimated 8,000 tonnes of lithium ion batteries end up in landfill every year¹². Currently there are no formal landfill bans or conditional disposal restrictions in Australia, but there are a number of take back and recycling schemes in place, such as MRI, Close the Loop and SITA Australia. There are a number of local government collection points, particularly in Western Australia, where local councils have provided over 150 drop off point locations¹³.

Victoria

Sustainability Victoria provides over 30 drop-off sites for handheld lithium ion batteries. Victoria has also conducted a review of battery stewardship in 2013 and is actively thinking about a potential product stewardship program.

¹¹ Y = Suitable, N = Not suitable

¹² MS2, 2013

¹³ The Australian Battery Initiative. 2016.



Western Australia

Residents in metropolitan Perth can deposit old household batteries in over 150 recycling bins around the city.

NSW

Sydney City Council has established a number of drop off locations to recycle handheld batteries as well as mobile phones and lightbulbs. The new NSW Community Recycling Centres, funded by the NSW Environment Protection Authority are also being rolled out to include the collection of batteries.

Nationwide

Nationwide there are a number of battery recycling points as listed below:

- 1. Battery World;
- 2. MRI;
- 3. Close The Loop;
- 4. Mobile Muster (mobile phone batteries);
- 5. ALDI; and
- 6. Suez Environnement;

Appendix D Stakeholder Consultation

Table 13 provides details of the workshop participants.

Table 13 - Workshop Participants			
Name	Organisatio		

Name	Organisation
Christopher Stewart	Department of Environment and Heritage Protection (QLD)
Esther Richards	Department of Environment and Heritage Protection (QLD)
John Cook	Tellus Consulting Group
Abbe Damrow	Northern Territory Environment Protection Authority
John Gertsakis	Infoactiv
Jesse Brown	Toxfree
Jason Cran	Toxfree
Tim Sheldon-Collins	Toxfree
Frank Klostermann	Toxfree
Tiana Nairn	Environment Protection Authority South Australia
Steven Sergi	Environment Protection Authority South Australia
Paul Starr	Department of the Environment and Energy
Sue May	Department of the Environment and Energy



Mike Ritchie	MRA Consulting Group
Ron Wainberg	MRA Consulting Group
Tiffany Key Correggia	MRA Consulting Group

Table 14 provides a summary of the workshop outcomes.

Table 14 - Key issues and actions identified during stakeholder consultation

Key iss	ue	Action
1.	There is disparity between States and Territories in current and planned future Bans and Restrictions. For example, Queensland is currently undertaking a process of consultation for a number of hazardous materials, including batteries.	The 'model approach' must recognise and build upon the current situation in all States and Territories.
2.	States will likely only consider bans where there is an alternative processing option available within a 'reasonable' geographical distance. For example, there may be a greater number of processing options within a 'reasonable' geographical distance for particular hazardous waste types in Victoria than in regional Queensland due to the distances involved.	The approach must include a coordinated review of the current processing technology for hazardous wastes available in all States and Territories.
3.	Some materials that are banned are not tracked under a National Environmental Protection Measure (NEPM) so data on the effectiveness of current bans is not always well tracked.	The approach must set clear monitoring and evaluation approaches and criteria from the outset.
4.	There needs to be effective education and consultation with local industry to ensure bans are effective.	The approach must ensure adequate lead in time for effective consultation with industry and to develop, trial and implement education to households and industry.
5.	Industry needs to have an opportunity to build processing infrastructure in regional and remote regions before a ban is implemented.	The approach must ensure adequate time to allow for processing infrastructure to be planned, developed and commissioned and must be flexible dependent on the material and current capacity.
6.	Funding for councils to move materials from transfer stations to the processor	Compensatory measures must be considered as appropriate.



Key issue	Action
must be considered. For example, the transport of fluorescent lighting to CMA Ecocycle in South Australia is potentially threatened by upcoming funding cuts.	
 South Australia has found it difficult to verify or quantify the number of materials bypassing schemes and going to landfill. Most data collected is via audits. 	The approach must set clear monitoring and evaluation approaches and criteria from the outset.
 It is difficult to ban a particular material/product and it may be preferable to focus on a substance, chemical or product with a specific environmental quality instead. 	The materials banned must be uniquely and effectively identifiable either by its material type or its specific environmental effect.
9. There are a number of disparate reasons as to why different hazardous materials end up in landfill that need to be considered in the planning phase. For example, SA conducted a detailed multi-criterion analysis (MCA) on what the issues and the potential solutions were.	There must be a full MCA conducted prior to any Ban being imposed.
10. Unless all States and Territories have a simultaneous ban to landfill, there may be incentive for materials to travel across borders.	To maximise effectiveness, all bans should ideally be national or the geographical distances to a landfill must be sufficient to act as a barrier to leakage.
 Bans may be more feasible in Southern and Eastern States than, for example, the Northern Territory where there are real barriers to operators. 	Disparate geographical restraints must be adequately considered prior to determination of policy and legislative instruments to control hazardous waste.
 There are inconsistent definitions of 'remote'. For example, 'remote' New South Wales will be very different to 'remote' Northern Territory. 	Terms must be clearly defined.
13. Many communities may need support to implement a ban.	Compensatory mechanisms alongside bans will be considered.
14. There needs to be direct regulated incentives for Product Stewardship to be	The approach must consider direct regulated incentives.



Key issue	Action
effective, otherwise materials may still flow to landfill because the targets are too low.	
15. In order to establish infrastructure, there is a time lag between planning and implementation. Industry must apply for approval, procure, construct and commission technologies. The time lag is dependent on the level of 'adjustment' to process all potential materials that would be made available should a ban be implemented.	A minimum of 4 years is required where there are no adequate processing technologies available prior to a ban being implemented.
16. There could be other policy instruments to consider that achieve the same objective, for example not approving any landfill licenses to accept the specific materials.	Whilst 'de facto bans through licensing restrictions' may be effective to divert waste from landfill, they will not be considered suitable where the objective of the ban is also to put the responsibility back on the generator.
17. Industry needs to be assured on a minimum quantity of product to ensure a return on investment of capital infrastructure.	The approach needs to ensure an adequate research phase to ensure that industry can be sure of quantities prior to investing in capital infrastructure.
18. Often Product Stewardship Schemes are driven altruistically by environmental issues, not the same drivers as hazardous waste bans.	The objectives of a Bans and Product Stewardship need to be clear and measurable from the outset.
 19. There are a number of materials currently or in consideration for a Ban: a. Tyres; b. Fluorescent tubes; c. E-waste; d. Lead acid batteries; e. End of life vehicles; f. Paint; g. Asbestos; and h. Medical and clinical waste. 	The list of problem wastes identified by multiple States and Territories need to be considered for Bans and Product Stewardship first.
20. In some instances, a Product Stewardship Scheme may not be necessary but it assists the 'politics' of implementing a Ban.	Product Stewardship for certain products should be considered as a political 'buffer' for Bans.



Key issue	Action
21. Often Bans are subject to State Government election cycles.	The approach needs to be supported by a clear direction from the Federal Government. Efforts should be made to secure bi-partisan support.
22. The Federal government does not currently have the legislative power or 'appetite' to impose Bans and Restrictions on States and Territories. They mainly work to negotiate with States and Territories.	The approach needs to be supported by a clear direction from the Commonwealth and the Commonwealth needs to act as a negotiator with States and Territories.
23. It can be difficult for States and Territories looking to develop a State Ban to negotiate the conditions imposed by the Office of Best Practice (OBP), which often delays the process.	The conditions imposed by the OBP should be reviewed to ensure they are not unreasonably inhibitive to the implementation of Bans or Product Stewardship Schemes.
24. The Mutual Regulation Act means that States and Territories cannot drive Product Stewardship Schemes at a State level.	Product Stewardship Schemes must be implemented by the Federal Government.
25. The hazardous waste categories in the National Waste Policy have not been reviewed. If they were reviewed they could be used as a starting point along with those already considered for Bans by States and Territories.	The approach should consider review of the hazardous waste categories in the National Waste Policy.
26. Procurement of the materials is often overlooked.	The 'model approach' should also consider government coordination of State Government Purchasing. For example, in Germany, some State Governments made the decision to only procure recycled paper.
27. The 'model approach' also needs to consider methods to influence the character of materials to influence the waste materials generated. For example, Chromium Copper Arsenic (CCA) treated timber.	The 'model approach' needs to consider methods to influence the character of materials generated.
28. Time and Education are key instruments in the process.	The model approach must ensure adequate time for implementation and education.



Key issue	Action
29. There is currently a lack of 'clear communication' about how Bans could be driven.	There needs to be clear communication about the policy direction for Bans.
30. The exclusion of producers and manufacturers from the process seeks to alienate the industry.	There must be a consultative process with industry prior to implementing a ban.
31. There may be a lack of coordination for independent processors.	Independent processors must be coordinated centrally.



Appendix E Draft Model Approach

