

HAZARDOUS WASTE IN AUSTRALIA : WHAT IS THE SCALE OF THE PROBLEM?

Briefing Paper 4

This paper explores issues surrounding the measurement of the scale of the hazardous waste problem in Australia.

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Environmental harm is a crime

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We welcome feedback

We welcome feedback on any of the issues raised in this paper – please email r.d.white@utas.edu.au or diane.heckenberg@utas.edu.au with your comments.

Please include the phrase *Scale of the problem* in the subject line of your email.

Thank you
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Introduction

This paper explores issues surrounding the measurement of the scale of the hazardous waste problem in Australia. The scale of the problem can be measured in a number of ways from the volume of waste generated to how much waste is transferred intrastate, interstate or offshore; who is generating the waste; different types of hazardous wastes; the biological, social and environmental impacts of hazardous wastes; through to the present and future impact of landfills for health and environmental wellbeing.

In 2009, the Environment Protection and Heritage Council (EPHC) announced six key directions set by the National Waste Policy, one of which relates directly to capturing the scale of the problem.

Providing the evidence – Access by decision makers to meaningful, accurate and current national waste and resource recovery data and information to measure progress and educate and inform the behaviour and the choices of the community (NWR 2010: 1)

A further important consideration should be to measure progress and educate and inform the behaviour and choices of commerce and industry, including Australia's growing resources sector.

The most recent evidence on the scale of the problem is presented in the *National Waste Report* (2010). The key question is how well do the current measures and resulting information and data inform our knowledge about the full scale of the hazardous waste problem in Australia?

Key questions:

- What do we know?
- What is being measured?
- How is it being measured?
- Who is doing the measuring?
- Who is monitoring the measurers?
- What does the data tell us?
- What gaps exist in the data?
- How consistent are the data collection methods?
- How user-friendly is the data?
- Does the data tell us what we need to know?
- Who has access to the data?
- Are we asking the right questions?
- How else could we collect data [e.g. qualitatively]?

Problems of measurement

The National Waste Report states that ‘there is no single, definitive, national information source on resource recovery and waste management in Australia, largely due to the fact that the Australian waste industry is regulated mainly by states and territories rather than by one central body’ (NWR 2010: 1). Information for this particular report was therefore drawn from a range of published sources including:

- Australian Government agencies including the Australian Bureau of Statistics (ABS)
- state, territory and local governments
- various industry information sources, and
- *Waste and Recycling in Australia* – three reports prepared by Hyder Consulting:
 - One published in 2006, covering the period 2002–03
 - One published in 2008 covering the period 2006–07, and
 - one published in 2009 updating data for 2006–07 and providing additional data (NWR 2010: 1)

The National Waste Report (2010:1-2) acknowledges limitations in its own data collection, some of which are detailed below:

- the authors of the report note that they ‘took a ‘slice in time’ approach, focusing on the data set for the 2006–07 financial year, *for which the fullest information* was available when the report was being prepared. Much of this information was first gathered by Hyder Consulting in 2008 and revised, in consultation with state and territory governments, during 2009;
- the report does not cover gaseous, liquid or radioactive waste, and it does not explicitly cover bio solids (the solid waste from sewage treatment plants), although data presented for some jurisdictions include disposal figures for bio solids
- waste and recycling in Australia’s external territories [such as Norfolk Island, Heard and McDonald Islands, Australian Antarctic territory] are also outside the scope of the report
- the fact that waste and recycling data are generated in variable ways by a range of agencies inevitably means that there are wide disparities in the detail, geographic coverage, scale, time frames and scope of the data

Given the current focus on waste as a commodity, the collection and analysis of data on hazardous waste re-use and recycling are important measures of the scale of the hazardous waste problem in Australia.

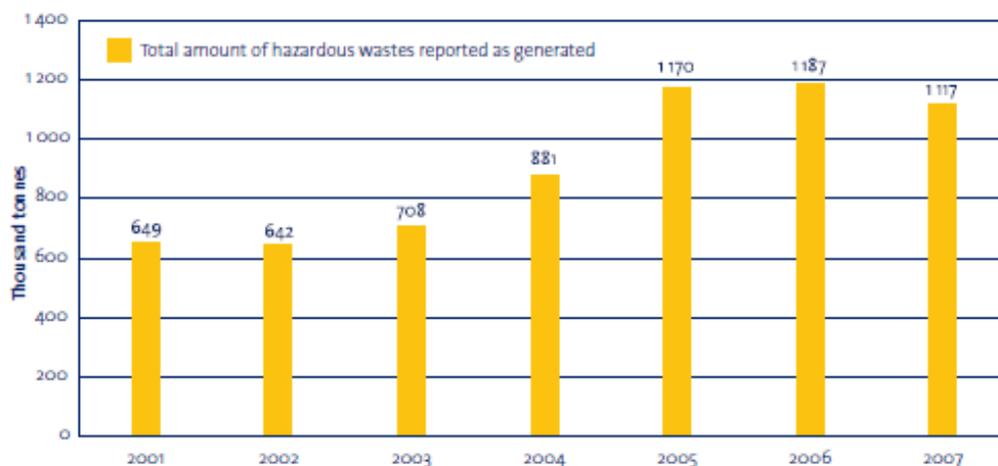
Scale of the problem at national level

Much of the data collected at the national level satisfies Australia's obligations and reporting requirements under the Basel Convention in terms of how much waste Australia generates and what volumes of waste are on the move as imports and exports.

Measuring the scale of the problem can be approached in at least four different ways:

1. **The scale of the problem can be measured in terms of the *volume* of hazardous waste *reported* nationally. This is illustrated in the figure below:**

Figure 4.1: Reported total amount of hazardous waste generated annually in Australia, using Basel Convention categories, 2001-2007



Source: National Waste Report (2010: 175)

It is important to note that this is the *reported* total amount of hazardous waste, raising the question as to which wastes are not represented. For instance, since the Basel Convention excludes radioactive wastes, it can be assumed that this hazardous waste stream is not reflected here.

What we know

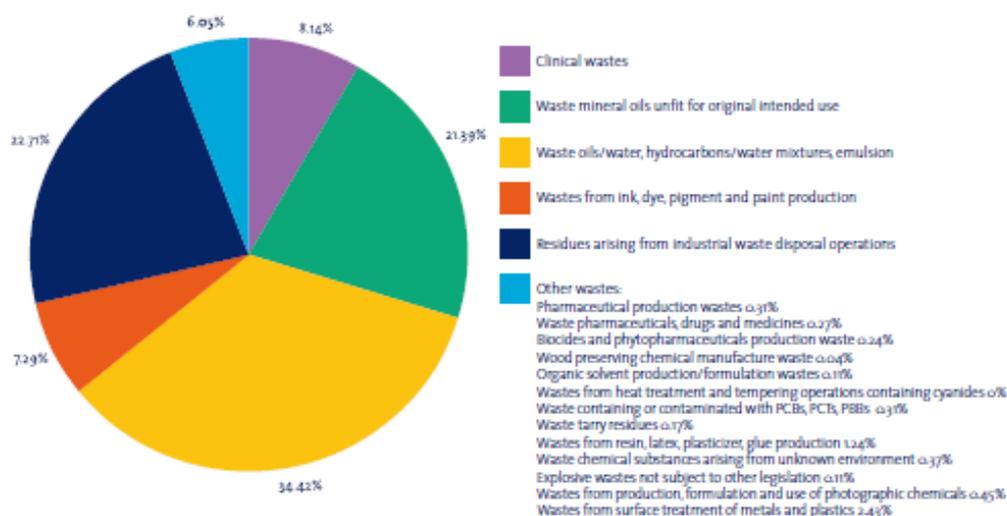
'In 2007, hazardous waste was estimated to be 1.1 MT, or 2.5 percent of waste generated within Australia' (National Waste Policy Fact Sheet 2010), but we know this is not the full measure of hazardous wastes because 'it does not include hazardous waste generated by consumers'. For example:

- the quantity of consumer related hazardous waste generated in Australia or disposed to landfill is unknown. However if annual quantities of computer waste were included in the figure above for 2007, the overall level of hazardous waste generated would rise by 20 percent. Adding other electronic waste (including TVs) and other products containing brominated flame retardants would increase this figure further (NWP Fact Sheet 2010)

The estimated quantity of hazardous waste generated in Australia has almost doubled from 0.6 million tonnes to 1.19 million tonnes per annum over the period 2002 to 2006, but this tells us little about who is generating which wastes, in which parts of the country

2. The scale of the problem can also be measured by *source/type of waste*. This is illustrated in the figure below – but how does an ‘outsider’ know which wastes are generated by whom?

Figure 4.2: Relative amounts of hazardous waste generated in Australia, by type of source (2007)



Source: National Waste Report (2010: 178)

The quality of information and reporting could be improved by addressing several interrelated issues identified in the National Waste Report (2010: 177). For example, some jurisdictions do not define as hazardous waste all of the materials that the Basel Convention defines as hazardous. This can lead to the exclusion of data on articles such as televisions, computers, mobile phones, fluorescent lamps and some batteries.

The information reported to Basel is compiled from state reported data, based largely on the Movement of Controlled Waste National Environment Protection Measure (NEPM), which is intended to track the **movement** of hazardous wastes interstate, rather than **waste generation** within a state (NWR 2010)

Moreover, 'some facilities which generate or transport hazardous wastes may not be providing information to the relevant jurisdiction, and not all states or territories are reporting the level of hazardous waste generated within their jurisdiction' (NWR 2010: 177).

For the above reasons, 'it is likely that the reporting for the Basel Convention underestimates the quantity of hazardous waste generated in Australia' (NWR 2010: 177).

3. The scale of the problem can also be measured in terms of the *volume* of hazardous waste *moving in and out* of Australia - but which wastes are excluded?

Figure 4.3: Reported imports and exports of hazardous waste



Source: National Waste Report (2010: 178)

4. The scale of the problem can also be measured in the *types* of hazardous wastes *moving in and out* of Australia –but which wastes are not captured?

We know, for instance, that between 2003 and 2007, a total of 154,639 tonnes of hazardous waste moved *out* of Australia including nickel-cadmium batteries, used lead acid batteries, e-waste and 'other wastes' but we know less about the composition of those wastes, particularly the largest component labelled 'other waste' (See Figure 4.4 below).

We know that between 2003 and 2007, a total of 35,400 tonnes of hazardous waste moved *into* Australia, including electronic waste, lithium ion batteries, used lead acid batteries, but again we know less about the composition of the largest component labelled “other wastes” (See Figure 4.5 below).

Figure 4.4: Reported exports 2003-07 (total 154,639 tonnes)

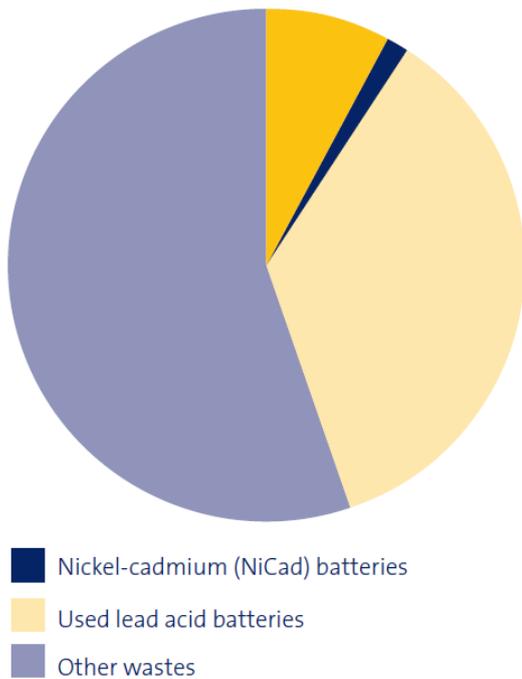
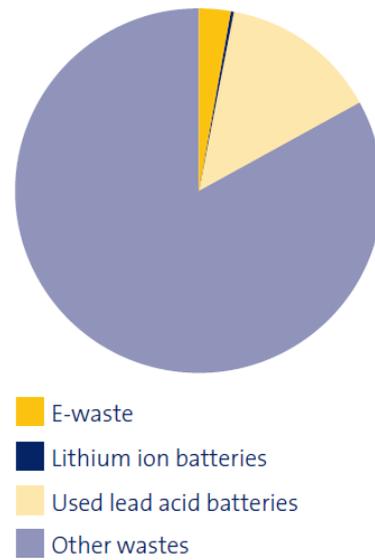


Figure 4.5: Reported imports 2003-07 (total 35,400 tonnes)



Source: National Waste Report (2010: 178)

For Waste Management Companies, such as Veolia Environment Services, the scale of the problem is reflected in terms of the *different types of waste* they collect and cart.

From paints and cyanide waste materials to caustic sludges and contaminated soils, Veolia Environmental Services provides expertise in the identification of appropriate collection, treatment and disposal techniques to develop comprehensive solutions for our customer’s hazardous waste disposal needs (Veolia 2010 at <http://www.veoliaes.com.au/commercial-services/waste-collection-and-recycling/hazardous-liquid-waste>)

In summary at a national level, the total volume of hazardous waste shown is only what is reported; it is likely to be underestimated and not reflective of all hazardous wastes, particularly those from the domestic waste stream. The volume of hazardous

waste appears to trend upwards since 2004, although this could be accounted for by varying definitions of hazardous waste or by different data collection methods.

Scale of the problem at state level

An illustration of data collection at the state level is provided by examining what occurs in Western Australia. According to the WasteNet (2005) website 'the hazardous waste stream [in Western Australia] is a relatively small contributor in terms of the total volume of waste, but due to the threat to the health of humans and the environment posed by hazardous waste, it can be the most destructive of all waste'. According to this same website 'insufficient data currently exists on the nature and quantity of controlled waste produced in Western Australia, to allow an effective management plan to be developed' (Wastenet 2005).

Table 1 Controlled wastes

Estimated annual quantities generated in Western Australia

Waste Stream	Estimated quantities
Clinical and related waste	10,000 - 20,000 tonnes
Septic tank and grease waste	50 ML
Non-sewerable industrial liquid waste (acids, alkalis, oily water)	20ML
Low level radioactive wastes	5 tonnes
Arsenic wastes	700 tonnes
Non-halogenated solvents	100 tonnes

Source: Wastenet 2005 <<http://www.wastenet.net.au/information/streams/hhcw>>

This is consistent with the National Waste Report finding that 'different Australian jurisdictions have adopted different definitions of hazardous wastes and the items and materials grouped under these definitions vary. Some jurisdictions list the materials, while others undertake a risk assessment process on a case-by-case basis' (NWR 2010: 173)

In summary at state level the scale of the problem is measured in terms of volume and current and future capacity for treatment and disposal, which also raises the issue of stockpiling.

Scale of the problem at municipal level

The pressing issue at municipal level is the level of hazardous waste generated at household level. As noted by WasteNet (2005), although the volumes may be smaller than those generated by industry, it is the relationship between individual households and methods of disposal of the waste that constitute part of the problem:

Approximately 15,000 tonnes of household hazardous waste is generated in the Perth metropolitan area annually. While this figure is far less than the quantities generated by certain industries, it is also much more dispersed and is more likely to be inappropriately stored or disposed of (Wastenet 2005).

The definition of municipal solid waste is significant, particularly in regards to its classification as hazardous.

Municipal solid waste (MSW) is largely derived from household waste and because of the potential for contamination with hazardous substances household waste is classified under the Basel Convention as requiring special attention. The proportion of household waste in MSW is difficult to determine but preliminary estimates indicate that it is around 90%.¹³ Thus, combining 90% of the 2006–07 municipal solid waste generation rate with the reported hazardous waste generation rate, using Basel Convention definitions, would mean that Australia (at least nominally) generated up to 12.6 million tonnes of hazardous waste in 2007 (NWR 2010: 177)

As mentioned earlier, given the focus on waste as a potential commodity, issues surrounding *recycling* and *reuse* also need to be factored into measuring the scale of the problem:

The presence of hazardous items in the municipal waste stream may also, if not properly managed, have a significant detrimental impact on the amount of material recycled and impose social and financial costs. Contamination of waste streams significantly reduces the material that can be recycled or the quality of the recycled end product, which in turn affects end markets and the confidence of potential users of the recycled product (NWR 2010: 169)

The Resources Sector

One of the recurring themes from our preliminary discussions with study participants was that Australia does not generate the same volume of hazardous waste as other parts of the world because it does not have the industrial base.

In light of the above discussion on measuring the scope of the hazardous waste problem, Australia's booming resources sector has to be considered as well:

Australia's thriving resources sector (comprising minerals and petroleum) is the country's largest single export sector. In 2006–2007 over 80 per cent of its output was exported, accounting for approximately 49 per cent of total goods

and service exports. During that period, the minerals and petroleum industries produced over eight per cent of Australia's GDP and accounted for 63 per cent of Australia's merchandise export earnings. Australian coal, liquefied natural gas, iron ore, copper, diamonds, zinc and many other minerals provide the essential ingredients of growth for many nations (Department of Foreign Affairs and Trade 2008).

Population change is also a factor in the scale of the problem. The most recent *State of the Environment Report* (2006), for example, captures the scale of the waste problem in terms of examining specific indicators in relation to the pressure that human settlements exert on the environment by extracting resources from it, and by generating wastes and emissions. As population grows and human settlements expand, the demands for resources as well as the amount of wastes generated increase (State of the Environment 2006).

In summary, 'accurate and more comprehensive data are needed to better quantify the level of hazardous waste generated and to inform the choice of appropriate strategies to manage the hazardous waste generated, including that found in the MSW, C & I and C & D waste streams' (NWR 2010: 177). Moreover, given the continuing expansion of the resources sector in Australia and stockpiles of present and legacy wastes from these activities, as well as population changes, more information is needed about how these are impacting upon the scale of the problem.

Information and Data

An entire chapter of the National Waste Report (2010) is devoted to 'improving the data' (NWR 2010: 293), focussing on the importance of accurate, consistent, transparent and timely data collection.

Who collects data?

Waste data are currently collected and reported by a range of stakeholders including but not limited to:

- landfill operators
- recyclers
- local government
- industry associations
- Environmental Protection Agencies (NWR 2010: 295)
- Waste authorities
- Federal and State government regulatory agencies

- Waste disposal and resource recovery facilities
- Businesses
- Service providers (NWR 2010: 301)

Collection and analysis of data is compounded by the fact that 'each of the stakeholders covers different regional areas and industries; waste data from rural and remotes areas is limited, and each uses their own waste terminology and classifications consistent with their own particular data collection and reporting requirements' (NWR 2010: 295).

A question that arises is how do 'outsiders' collect data on the scale of the hazardous waste problem in Australia, especially given that 'in-house' data within government agencies and corporate offices may not be readily available to outside interests. The accessibility of data (e.g., for internal or external use) can hide a multitude of sins, including 'we don't collect it'.

Gaps and limitations

The National Waste Report (2010) highlights 'a lack of comprehensive consistent and empirically based data' in a number of areas, including hazardous waste:

- landfill data
- organics data
- *hazardous waste*
- performance against the waste hierarchy, and
- local government information (NWR 2010: 293-294)

Data limitations identified as specific to hazardous waste include:

- the amounts and types of hazardous wastes
- hazardous waste treatment infrastructure
- the generation of hazardous waste by households
- the types of hazardous wastes disposed to landfill
- the impacts of hazardous wastes on air, water, land, ecosystems and human health (NWR 2010: 293-204)

Issues identified as affecting the ability of states and territories to collect and manage accurate, consistent, transparent and timely data include:

- the use of estimated, rather than measured data
- the measurement of load volumes (cubic metres) instead of weight (tonnes), particularly in relation to green waste
- the voluntary nature of some reporting and the lack of associated deadlines/ defined reporting periods and auditing

- voluntary basis of some surveys leading to lack of response and poor data
- the use of a mixture of electronic and paper based systems, leading to varied interpretation of data provided
- the reliability of the performance of online systems
- lack of comprehensive data capture systems in some jurisdictions
- lack of analysis (cross checking) of waste tracking records from industry
- poor linkage between waste tracking databases and licensing systems in some jurisdictions
- labour intensive, manual input/transfer of data from paper records which can result in human error
- lack of consistency in waste classification
- different organisations requiring data in different formats
- limitations in the data from some unstaffed rural and remote facilities
- confidentiality issues with operators, particularly for limited, spatial dependent surveys, and
- poor historical data, making trend analysis difficult (Haines and Edgar 2009, cited in NWR 2010: 300)

Developing a national waste data system

Based on the *National Waste Data System Requirements Study* (Haines and Edgar 2009), the Department of Sustainability, Environment, Water, Population and Communities (2010) summarise the following challenges for the development of a national waste data system:

- lack of administrative support for national waste reporting;
- inconsistent waste classification and terminology;
- differences in data collection and reporting requirements and methods;
- limited understanding of waste's life cycle impacts;
- aligning national waste data reporting with other systems (eg NPI and NGERS);
- lack of fundamental data sets to inform waste management policies, practices, investment, business operations and to assess and manage risk.

Matters considered important to development of a national database include:

- ownership
- data prioritisation
- stakeholder engagement
- confidentiality
- legislative change and
- comprehensive and strategic data capture

Reliable data collection, management and analysis is essential to confident decision making regarding what to do with waste and how best to regulate and manage its storage, transport and treatment. There is an intrinsically important relationship between data and decision making processes.

With this in mind, Haines and Edgar (2009) drew on the views of key stakeholders including state and territory government departments, leading waste consultants, local government associations, regional waste authorities and waste associations, noting that these are the people 'who work with and rely on waste data to make decisions'. To do this well, they need the best reporting systems possible.

Conclusion

The question remains unanswered as to whether it is possible to provide a comprehensive picture of the scale of Australia's hazardous waste problem at national, state and municipal levels. This endeavour is hampered by issues of measurement and the lack of accurate, nationally consistent data and information.

In most states and territories, waste management data systems primarily rest with the environmental regulator with some assistance from the waste authorities. The range and nature of data collected generally serves to meet legislative and reporting requirements which differ between jurisdictions (NWR 2010: 295).

the fact that waste and recycling data are generated in variable ways by a range of agencies inevitably means that there are wide disparities in the detail, geographic coverage, scale, time frames and scope of the data (NWR 2010: 2).

We are also mindful of the comments of the Victorian Auditor General's Report on EPA Victoria (2010: 9-10). For this audit, the EPA provided a range of data from TransCert that reconciled:

- the amount of waste produced, by waste type
- the amount of waste treated and the treatment type
- the origin of the waste, by Australian state

The Auditor General noted that this data purports to show the quantities of hazardous waste produced and where it ends up. However, the data is based on information that transporters, waste producers and receivers have provided to the EPA, and it represents only hazardous waste that the EPA is informed about. The Auditor General points out that if hazardous waste is produced but not transported, such as stockpiling, then in the absence of robust compliance monitoring, the EPA is unlikely to have a clear understanding of the amount of hazardous waste produced.

This is exacerbated by the lack of any oversight for direct beneficial reuse (VAGR 2009: 9-10)

In conclusion, if we are to accurately measure the scale of the hazardous waste problem in Australia, then the challenge lies in deciding which wastes to measure, what types of sources will provide the most reliable data, from whom data will be collected, how it will be analysed and reported, and to whom it will be made available.

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