

# **Report on the Extended Producer Responsibility Preliminary Consultation Program**



**Department of  
Environment and  
Conservation (NSW)**

*Report on the Extended Producer Responsibility Preliminary Consultation Program* was prepared by the Waste Management Section of the Department of Environment and Conservation (NSW).

*In September 2003, a number of agencies within the NSW Environment portfolio were amalgamated to form the Department of Environment and Conservation (NSW). These agencies included the Environment Protection Authority, the National Parks and Wildlife Service, the Royal Botanic Gardens and Resource NSW. The new department will now meet the responsibilities of the former EPA, including preparation and implementation of an annual EPR Priority Statement.*

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## **1. Introduction**

The *Waste Avoidance and Resource Recovery Act 2001* requires the Environment Protection Authority (EPA) to develop an annual statement identifying the extended producer responsibility (EPR) schemes it plans to recommend to the Minister. As part of the preparation of its first Priority Statement, the EPA released a Consultation Paper for comment in February 2003. This led to extensive briefings and roundtable discussions with key stakeholders from the industries responsible for the wastes identified in the paper. By the time the period for comment closed in April, the EPA had received 86 submissions on the paper.

*Extended Producer Responsibility Priority Statement 2004* reflects the outcomes of this broad community consultation. The Priority Statement identifies 16 final wastes of concern, with nine to receive priority focus over the next 12 months, together with the actions key stakeholders will be expected to take to reduce the amount and/or impact of these wastes in the waste stream.

This *Report on the Extended Producer Responsibility Preliminary Consultation Program* outlines the consultation process and the community's response to the proposals in the Consultation Paper. The Priority Statement should be read in conjunction with this report.

## **Department of Environment and Conservation**

In September 2003, a number of agencies within the NSW Environment portfolio were amalgamated to form the Department of Environment and Conservation (DEC). These agencies included the Environment Protection Authority. As a result, the DEC is now responsible for coordinating EPR in NSW and is the publisher of this report and the first annual EPR Priority Statement.

## **About this report**

Chapter 2 of this report outlines in detail the consultation process followed before *Extended Producer Responsibility Priority Statement 2004* was finalised and published.

Chapter 3 summarises the community's responses to the key policy issues associated with implementing EPR schemes, including the adoption of EPR as an approach to managing waste; the assessment criteria used to identify wastes of concern; appropriate EPR instruments; criteria for evaluating EPR schemes; and the role and composition of an Expert Reference Group, which will advise the DEC and the Minister for the Environment on EPR schemes.

Chapter 4 summarises the comments received on each of the nominated wastes of concern and outlines current action being taken to manage these wastes.

The Appendixes to the report contain:

- a list of those who made submissions on the consultation paper
- updated fact sheets on the wastes for priority focus over the next 12 months
- a brief guide to EPR developments overseas for the nominated wastes
- an extensive reference list for those wanting more information on EPR schemes for particular waste streams.

## 2. Consultation process

The EPA released *Consultation Paper: Extended Producer Responsibility Priority Statement* on 7 February 2003 for comment by 30 April 2003. Copies of the paper and invitations to comment were mailed directly to key firms and organisations associated with the nominated wastes of concern, especially those for priority focus. Other groups targeted included professional industry groups and associations, environment groups, local government organisations and councils, relevant state and Commonwealth government agencies throughout Australia and waste industry representatives.

A Ministerial media release announcing the consultation process was issued on 7 February and further releases followed in early April to remind target industries and the broader community about the issue. The availability of the paper was advertised in *The Sydney Morning Herald* and *The Land* in late February and articles placed in key industry newsletters and journals in March/April. During the consultation period, over 1500 copies of the paper were distributed and it was viewed 937 times on the EPA website, including 25 visits from overseas.

The EPA arranged formal briefings and roundtable discussions with industry leaders in the electrical sector and the tyre industry in late February to acquaint them with the scope of the proposals. A number of follow-up briefings and discussions have since been held with representatives of these industries to consider both state and national developments in relation to electrical products and tyres.

At their request, presentations on EPR and informal discussions took place with broader industry groups, the recycling industry, local government, community groups, the mobile telecommunications association, the plastics and chemicals industry, waste management organisations and the packaging industry.

Presentations on EPR at the Australian Industry Group Fifth National Environment Conference (5 May 2003), the Plastics and Chemicals Industries Association National Conference (12 May) and the NSW Waste Management Conference and Expo (5 June) reached a combined audience of about 220 delegates. At the waste conference, EPR was also discussed by a panel of people with different perspectives and backgrounds (non-government, industry, academic, etc.) and they were generally positive about EPR and its role in waste management.

To promote broader community understanding and debate on the issue, the EPA and Resource NSW<sup>1</sup> sponsored the Total Environment Centre's Green Capital Forum on EPR on 28 May 2003. The breakfast meeting attracted over 260 people from corporate, government and non-government organisations and was ranked positively by most in attendance for the high quality and diversity of views expressed by keynote speakers and panelists.

The EPA received 86 submissions on the paper, including 36 from industry, 23 from local government, 10 from NSW Government agencies, seven from community and environment groups, seven from individuals and three from interstate agencies. See Appendix I for details.

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<sup>1</sup> Since September 2003, Resource NSW has been part of the Department of Environment and Conservation (NSW).

### 3. Comments on general EPR issues and framework

Most of the submissions on the Consultation Paper commented on one or more of the 16 proposed wastes of concern and these responses are detailed in Chapter 4 of this report. A number of submissions also commented on the broader conceptual and policy issues associated with the introduction of EPR schemes and details of these submissions are outlined below.

#### EPR as a concept/approach

In general the community's response to the proposals on EPR schemes for NSW was positive, although there were some differences in attitude between the sectors that responded.

##### *Environment groups*

The six environment groups were highly supportive of the new policy approach. Comments included:

- EPR has a critical place in waste avoidance and reduction because it promotes better design of consumer products and stimulates cleaner production strategies in industry.
- EPR can significantly reduce environmental contamination and health risks to communities.
- EPR must be used as a tool to move the production/consumption cycle from reuse up to the pinnacle of the waste hierarchy: avoidance.
- EPR is a key policy for the management of waste and resource recovery across NSW and Australia. It redirects the costs of managing the waste stream to those companies and industries that are responsible for the production of waste in the first place. EPR not only penalises the poor performers but can also create a more equitable cost base for responsible companies that embrace cleaner production and waste avoidance.

##### *Community groups and individuals*

One community group noted that the aim of EPR is to encourage producers to prevent pollution and reduce resource and energy use in each stage of a product's life cycle through changes to product design and process technology. The most efficient point in the life cycle of a product to solve a toxic problem is during its manufacture. However, this group went on to say that, as the majority of Australia's computers and peripherals are imported, EPR might not be the most effective tool for dealing with the deadly waste in end-of-life electronics.

The seven individuals who commented on the Consultation Paper mainly discussed particular products or wastes. One said that avoiding waste should be the main goal of EPR.

##### *Local government*

The 23 local government organisations were mostly highly supportive of EPR, particularly as it has the potential to reduce the burden on municipal waste collection systems. The following are some of the views they articulated:

- The **Local Government and Shires Associations** strongly supported the principle of EPR and welcomed a thorough investigation of industry sectors which should be targeted for an EPR approach. However it was important to clearly understand and accept that EPR targets the *producer*, that is the corporation that voluntarily undertakes to enter the

marketplace and produce goods for profit. Under a genuine EPR scheme, the producer bears the responsibility for managing the product throughout its life cycle. Local government asserts that, while industry may be reluctant to accept full responsibility for the wastes created from its production, it would embrace a system which provided certainty, clear allocation of responsibility and a 'level playing field'.

- It is commendable to extend the responsibility for managing waste products to producers and manufacturers and to internalise disposal costs. However, systems such as these depend strongly on extensive community and business awareness. All EPR schemes will therefore need to be supported by education and promotion programs.
- One of the most crucial initiatives in any EPR scheme will be at the product design stage. Rather than designing obsolescence into the product, there needs to be a reduction in the resources used.
- **Marrickville Council** was strongly supportive of initiatives to improve the way society manages waste and welcomed initiatives that spread the responsibility across all sectors.
- If the EPR philosophy becomes generally accepted throughout the community, it could have a positive impact on councils and the community.
- EPR schemes need to be accessible in regional areas as well as metropolitan centres.
- The State Government must take the lead in making at least some EPR measures mandatory. Continuing to step around the problem in the hope that producers will suddenly become good corporate citizens is an unrealistic response and unfair to those who do show responsibility.

### *Industry*

The 36 submissions from industry expressed a diverse range of views. Some objected to the terms 'EPR' and 'product stewardship' being used interchangeably. However, section 15(2) of the *Waste Avoidance and Resource Recovery Act 2001* defines EPR as including product stewardship schemes.

Industry comments included:

- It is clear that EPR 'works best when the right incentives are in place'.
- EPR can include different types of responsibility such as 'liability for environmental damage; economic responsibility for the cost of product collection, recycling, treatment and disposal; physical responsibility for the management of products through their life cycles; and responsibility to provide information on products and their environmental impacts'.
- **Avcare Ltd** commended the Priority Statement, which it believes will serve as a very useful guide for continuous waste management improvements. The agricultural and veterinary chemicals industry will support government in achieving timely implementation of the principle of EPR, through the stewardship programs, drumMUSTER and ChemClear.
- The **Australian Tyre Recyclers Association** welcomed the EPA's focus and fully supported any efforts to further lessen the environmental impact of the whole life cycle of tyres from production through consumption to disposal and recycling.
- Any mechanical-biological treatment would be more effective in recovering resources from the waste stream if contamination were minimised and so **Global Renewables Ltd** keenly anticipated success in reducing the incidence of toxic, hazardous and non-recyclable materials in the waste stream.



- The **Beverage Industry Environment Council** supported the EPA's intention to significantly reduce the amount of materials sent to landfill, increase the use of renewable and recoverable materials, and avoid the creation of waste.
- The **Australian Council of Recyclers** supported EPR where alternative schemes were not in place or engaged. However, the council believed schemes must be national in their delivery with producers (or brand owners) clearly identified for each waste of concern. EPR and product stewardship are two distinct approaches and council members do not see product stewardship as a subset of EPR. The council supported EPR for products that contain toxic or hazardous constituents which may present a threat to health and safety and a burden on end-of-life management.
- **Metalcorp Recyclers** said there needed to be a shift in the responsibility for residuals to the stakeholder who has the most ability to influence whatever hazardous or toxic materials remain in the end-of-life product. EPR is therefore the most appropriate way of pushing 'design for environment' or 'design for recycling'.

Some industry submissions raised concerns about EPR:

- 'The EPA needs to clarify how it will seek to enforce responsibility on imported goods.'
- The **Australian Environment Business Network** said for many wastes the best environmental outcome was to send them to landfill. The EPA had to be careful in imposing EPR regulations to avoid lowering overall environmental outcomes.
- The **NSW Minerals Council** did not support the introduction of an EPR-related levy-benefit scheme for tyres as any levy imposed on importers or producers is highly likely to be passed on as a cost to customers.
- The **Australian Food and Grocery Council** said the Consultation Paper did not reconcile minimising post-consumer waste in the context of the full life cycle of products. For example, packaging may represent only a small component of a product's environmental footprint and preserve its useful life. Where EPR focuses on one part of the production chain only, it risks incurring costs in other parts of the supply chain. EPR may increase complexity and compliance costs. The 'producer' needs to be clearly defined. If producers cannot influence the ways consumers dispose of goods, EPR may have little effect. The council queried applying the policy to all wastes and questioned the effectiveness of some EPR tools, especially eco-labelling and container deposit legislation.

Five industry submissions specifically favoured the use of voluntary action over regulatory EPR schemes:

- While commending the EPA for considering policy options in the management of various waste streams, the **Vinyl Council of Australia** believed that in the case of PVC products, the industry's voluntary approach to the stewardship of its products was the most appropriate mechanism for going forward.
- In the view of the **Plastics and Chemicals Industries Association**, an industry-wide and supply chain-based voluntary approach is the most appropriate mechanism for achieving positive outcomes for end-of-life materials and products. Product stewardship covers all stages of a product's life and is intended to prevent misuse, mishandling or other activities that might result in harm to people or the environment. Targeting a single functional point in the supply chain (producers) rather than encompassing broader involvement and consistency could reduce the likelihood of achieving desired outcomes.
- The **Australian Information Industry Association** believed that industry has a shared responsibility, along with other participants in the product life cycle, to manage the environmental impacts of their products from design to their ultimate disposal. The approach needed to be voluntary, dynamic and encourage change, which reflects

Australia's circumstances, industrial base and societal expectations. The introduction of EPR schemes for computer waste will have significant cost and market implications. At this stage, the association does not believe that EPR is the most effective tool for addressing computer waste.

- **IBM Australia** believed that the most effective product take-back solutions would be implemented through voluntary actions by government, manufacturers, retailers and consumers without the need for legislation or regulation. If legislation became necessary, it had to be national in scope.
- The **Australian Industry Group (AIG)** said industry self-regulation would provide a better outcome than statute and it had a strong preference for the term 'shared producer responsibility' over EPR. The AIG said that its preferred term recognises the critical importance of influencing the behaviour of the market by ensuring that all elements of the supply chain, including the ultimate end-consumer of goods or services, must share in the cost of managing that waste.

## Assessment criteria for wastes of concern

The assessment criteria used to identify the wastes of concern suitable for management by EPR schemes were:

- the detrimental environmental and/or public health impacts resulting from the waste
- the total volume of the waste requiring disposal and/or the percentage of the waste stream it comprises
- the potential for beneficial resource recovery
- the likelihood of illegal disposal through dumping or littering
- the level of community concern about the waste
- the extent to which EPR is the appropriate tool for managing the waste.

All the nominated wastes of concern satisfied the last criterion and several of the other criteria.

Twenty-four submissions commented on the assessment criteria with 13 simply endorsing the criteria as logical, reasonable and measurable.

One submission said the criteria should be applied to wastes as a set, with those scoring highest on a substantial number of criteria being given the highest priorities for action. This is essentially the approach the EPA adopted.

Seven submissions suggested that weighting of the criteria according to importance would help in comparing the impact of various wastes. One of these suggested that more weight should be given to products with the highest 'detrimental environmental impact', another said that it should be given to 'toxicity', and a third that products with long-term impacts, such as pesticides, should be more heavily weighted.

One submission on the third criterion questioned the importance of the 'potential for beneficial resource recovery' as manufacturers should bear responsibility for the environmental impacts of their products regardless of the potential for resource recovery. Another said this criterion was contradictory because industry could be disadvantaged by improving the 'potential for beneficial resource recovery'. However, in the DEC's view, this criterion is relevant in determining whether certain products are suitable for management by EPR schemes.

This submission also noted that the fourth criterion – 'the likelihood of illegal disposal through dumping or littering' – could be influenced by education and infrastructure. The DEC

accepts this and recognises that EPR schemes may provide a funding mechanism for such education and infrastructure. This submission went on to say that ‘the extent to which EPR is the appropriate tool for managing the waste’ should not be confined to whether EPR is the ‘most’ effective tool.

One submission said the last criterion should be amended to read ‘the extent to which EPR is the appropriate tool for managing *each waste stream at this and future times*’. This is the intention of the criterion.

One local government organisation said that particular consideration should be given to existing disposal, reuse and reprocessing options and infrastructure in regional areas, when assessing wastes of concern. When EPR schemes commenced, reuse might increase, thereby reducing the level of ‘concern’ about the waste, but it was important that manufacturers were not permitted to revert to former practices.

The **Nature Conservation Council** (NCC) believed the assessment criteria needed to be supported by clear definitions and an assessment of the relative impact of substances across the product life cycle. Material accounting techniques were one option in this regard. The NCC suggested that when measuring the total volume of waste requiring disposal, the potential, relative and absolute contributions to landfill diversion should be measured.<sup>2</sup>

The NCC also had the following proposals or additions to specific criteria:

- amending the third criterion to read ‘the potential for beneficial resource recovery *and reuse*’
- adding another criterion, ‘*risk management and support for reuse and resource recovery industries*’ as risks are primarily managed through schemes supporting source separation
- amending the fifth criterion to read ‘the level of community concern about the waste *and social costs and benefits*’, which would include issues such as employment impacts, participation in recycling schemes and transfer of costs for waste management, but which, in the DEC’s view, are more relevant to the evaluation of EPR schemes than to identifying wastes of concern
- adding another criterion, ‘*the extent to which EPR can foster resource efficiency innovation*’ to deal with technological changes, such as the switch away from cathode ray tubes, and national self-sufficiency issues.

Other submissions suggested the following additional criteria:

- ‘*the type and total amount of non-renewable resources lost if the material was landfilled or disposed of in an alternative way*’
- ‘*the potential for contamination of other materials in the waste stream and the potential to interfere with resource recovery (to reduce feed stream toxicity resulting in better recycled organic material)*’
- ‘*the potential to avoid waste by better product design*’
- ‘*the potential to reduce waste through education*’.

In the DEC’s view, the terms of the first proposed assessment criterion encompasses the first suggestion above. Both the second and third suggested criteria, the ‘*potential to contaminate other waste streams*’ and ‘*potential to avoid waste*’ are matters that should be taken on board. On the fourth point, it is likely that all wastes could be reduced by targeted education programs so this criterion is not considered critical to the determination of wastes of concern for EPR.

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<sup>2</sup> In the DEC’s view, the data would not always be available to do this.

See *Extended Producer Responsibility Priority Statement 2004* for details on how the assessment criteria were revised.

## Wastes of concern

Using the original assessment criteria, the Consultation Paper nominated 16 wastes of concern as being suitable for management by EPR schemes.

Thirty-nine submissions commented on the wastes of concern, mostly to support those identified, although many nominated one or more additional products/wastes for consideration. Chapter 4 has detailed comments in relation to particular products/wastes. In many cases, additional wastes were nominated with no supporting comment or data.

The following were proposed as possible additional wastes of concern for the reasons cited in parentheses (where reasons were given):

- biomedical waste, such as incontinence pads and disposable nappies (health and safety issue and replacement or recovery needs to be considered) (7 submissions)
- bulk packaging materials, such as disposable pallets for warehousing (1)
- car batteries (1)
- chewing gum (amenity issues) (3)
- community sharps<sup>3</sup> (appropriate for take-back) (10)
- construction and demolition waste, such as bricks, concrete, masonry and tiles (high volume, large user of landfill space and appropriate for reuse) (7)
- fax machines and photocopiers (1)
- foam rubber in mattresses and sofas and other furniture (due to high volume, bulk, extensive dumping and health risks) (11)
- gas cylinders and fire extinguishers (3)
- gases from cooling instruments, including air-conditioners and refrigerators (which should be collected before disposal) (1)
- glass beverage containers and jars (1)
- light bulbs and halogen tubes (1)
- nursery pots (should be made of recyclable plastic) (1)
- pharmaceutical products (1)
- plastic bags (ubiquitous and problematic in waste disposal facilities) (9)
- printers and scanners (1)
- printer cartridges (1)
- polystyrene (bulky, contaminates recycling and could be replaced with corn starch products) (6)
- putrescible waste (1)
- radios, and video and CD players (1)

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<sup>3</sup> 'Community sharps' are defined by the Community Sharps Management Reference Group, convened by NSW Health, as sharps that have been generated in a non-clinical setting, including needles, syringes and lancets used by people with diabetes and other medical conditions requiring self-injection in the home, and syringes used by injecting drug users in the home or in public places.

- used food oils and fats (because of their potential for beneficial resource recovery) (2)
- used motor oils (existing product stewardship scheme should be monitored) (3)

Many of these 'additional' wastes had already been included in the wastes of concern identified in the Consultation Paper:

- Car batteries were part of the Household Hazardous Waste Components category and the DEC agrees that community sharps, used food oils and motor oils should also be dealt with under this heading.
- The existing broad category of electrical products encompasses fax machines, light bulbs and lighting equipment, photocopiers, printers, printer cartridges, scanners, radios, video and CD players. Action on these products needs to be phased in over time, in line with priorities agreed with the electrical industry.
- The category of packaging waste already included glass containers and jars, plastic bags and polystyrene, although the DEC has decided to treat plastic bags as a separate category in future.

A brief analysis of the additional products/wastes nominated by more than one organisation against the assessment criteria is provided in Table 1. This suggests that further consideration may need to be given to gas cylinders and fire extinguishers. Over the next 12 months, the DEC will seek more information from landfill operators and relevant recovery/recycling facilities on gas cylinders and fire extinguishers (such as the numbers being disposed of to landfill and being received by metal recycling facilities) to determine whether they should be identified as wastes of concern in future Priority Statements.

Construction and demolition (C&D) waste already has a high resource recovery rate compared with other waste streams without the need for product stewardship schemes: 65% is recovered as opposed to 26% of municipal waste and 28% of commercial and industrial waste (Resource NSW 2003a, p.4). There is extensive reuse of construction material both on-site where it is generated and for a range of other purposes, such as roadworks, drainage and other opportunities. A recovery target of 76% by the year 2014 has been set in NSW. Particular products have been targeted for action under *NSW Waste Avoidance and Resource Recovery Strategy 2003*, including concrete, spoil and rubble. Technical end-user specifications for using recovered concrete in engineering applications, such as roads, have been developed and published (Resource NSW 2003b). A system for classifying and testing recovered timber is under development, which will ultimately lead to a series of end-use specifications for target markets, including reuse, furniture manufacture, timber panels and products, compost and fuel.

The primary instrument in NSW to deal with C&D waste is the waste levy, as this has provided a strong incentive to recover products that are heavy and bulky. Other measures include:

- The NSW Government's *Waste Reduction and Purchasing Policy* requires all State Government agencies to develop and implement a plan to reduce waste and increase the purchase of recycled content material in four areas, including construction and demolition material (EPA 2000).<sup>4</sup>

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<sup>4</sup> WRAPP plans must also target paper products, office equipment and consumables and vegetation material (tree clippings, leaves, etc.)

**Table 1: Assessment of products as potential wastes of concern**

<b>Product/ waste</b>	<b>Environmental/ health impacts</b>	<b>Waste volume</b>	<b>Reuse/resource recovery potential</b>	<b>Potential to contaminate other waste</b>	<b>Illegal dumping/ littering</b>	<b>Community concern</b>	<b>EPR an appropriate tool?</b>
Biomedical waste	High	Data needs to be compiled	Low to nil	High	Low	Low	Low
Chewing gum	Nuisance/minor amenity impacts	Low	Nil	Low	Some littering	Low	Low
C&D waste	Analysis required for specific wastes	Analysis required for specific wastes	Currently at 65% recovery with target of 76% set in <i>NSW Waste Avoidance and Resource Recovery Strategy 2003</i>	Depends on waste stream but mostly low. Asbestos wastes a problem but subject to regulation.	Some illegal dumping but subject of major education and enforcement campaigns	Low	Low: see comments in text
Foam rubber and furniture	Used mattresses have potential health issues	No available data and further information needed	High recovery of used furniture by commercial and charitable schemes but little to no recovery potential for foam rubber and mattresses	Low	Low to moderate	Low	Low
Gas cylinders and fire extinguishers	Most end-of-life gas cylinders appropriately disposed of in NSW, with gas removal, depressuring and spiking allowing dispersal of remaining gases	Estimated 100,000 transportable gas cylinders disposed of annually in NSW; only a small number disposed of inappropriately (EPA 2001b).	Moderate	Moderate to high, particularly when hidden in other materials sent for metals recovery; some explosions have occurred.	Low	Low	Some potential

- ‘Waste Not ...’ Development Control Plans enable local government to control C&D waste by requiring a waste management plan to be part of a development application. The waste management plan outlines how waste is to be minimised and/or recovered during the construction and operational phases of the development.
- The Sustainability Advisory Council is developing a Building Sustainability Index (BASIX) to drive the improvement of sustainability practices in the construction industry. Resource NSW developed two categories for the index: materials selection and waste and recyclables. Resource NSW (2002a) also published the *Construction and Demolition Recycling Directory*, listing over 250 facilities in the Sydney metropolitan area.

The submissions also suggested that the categories could be refined by combining whitegoods residuals with electrical equipment, televisions with consumer electronics, and agricultural/veterinary chemicals with agricultural/veterinary chemical containers. The DEC agrees with the first suggestion only. Chapter 4 has more detailed comments.

Five submissions disagreed with the nomination of one or more of the following as wastes of concern: cigarette butts, computers, office paper, plastic and other packaging, and PVC.

Detailed comments are outlined in Chapter 4 of this report. These comments have been taken into account in refining the list of wastes of concern for *EPR Priority Statement 2004*.

## Wastes for priority focus

In the Consultation Paper, the EPA proposed to give priority focus to eight wastes of concern in the first 12 months, including:

- four wastes currently without EPR schemes – used tyres, computers, televisions and NiCad batteries
- four wastes with product stewardship schemes already in place or proposed, which would be closely monitored with a view to assessing how effective they are – agricultural/veterinary chemicals, agricultural/veterinary chemical containers, mobile phones and batteries, and packaging waste.

Twenty-nine submissions commented directly on the selection of wastes for priority focus. Detailed comments in relation to particular products are outlined in Chapter 4 of this report.

In general, the submissions agreed with the wastes nominated for priority focus. However, three submissions said used tyres should have a lower priority than more toxic products, another said cathode ray tubes should have priority rather than whole computers and televisions, and one submission was uncertain about the need to give priority to NiCad batteries.

Ten submissions expressly said that packaging waste in general (5), or streams within it, such as containers (1), plastic bags (3) or polystyrene (1), should have priority focus. Twelve submissions (including two from the above group) supported more immediate action, such as advance disposal fees or container deposit legislation, particularly for packaging waste from the food and beverage industry. Some of these submissions said that the National Packaging Covenant was not an effective product stewardship scheme.

One submission suggested that the EPA should also monitor the used oil product stewardship scheme. The DEC does not consider this to be necessary as the scheme is monitored by the Department of the Environment and Heritage and has been under active review (MMA/BDA Group 2003).

Suggestions to vary the wastes for priority focus in the next 12 months included the following:

- asbestos (1 submission)
- all electrical goods (1)
- cathode ray tubes (1)
- community sharps (1)
- containers (1)
- end-of-life vehicles (1)
- fluorescent tubes (1)
- furniture, both office and domestic (1)
- household hazardous and chemical wastes, particularly automotive chemicals, batteries, gas bottles, lubricants and oils, paints, pesticides and solvents (5)
- light bulbs (1)
- medical waste (1)
- plastic shopping bags (3)
- pharmaceuticals (1)
- polystyrene (1)
- PVC (1)
- putrescible waste (1)
- timber treated with copper chrome arsenate (2)
- waste electrical and electronic equipment, including computers, televisions, video display units, NiCad and other batteries (1)
- window and mirror glass (1)

The **Nature Conservation Council** (NCC) suggested that the EPA assess the following products as possible priorities in 2004:

- batteries containing mercury
- lead-acid batteries
- fluorescent tubes
- timber pallets.

Batteries containing mercury are covered in the household hazardous waste category and the DEC will consider the need to give priority to this stream within the broad category. A recent paper prepared by Environment Australia estimated that the current recycling rate for lead-acid batteries within Australasia was between 86 and 96%, with a mean value of 91.3%. It is unlikely that any EPR scheme would achieve higher collection and recovery rates than those already being achieved commercially (Environment Australia 2003).

Fluorescent tubes are already a waste of concern as part of the broad category of electrical goods, and the NCC's view will be taken into account during the prioritisation of further electrical waste components. Timber pallets are a form of packaging waste and could usefully be considered as part of the review of packaging under the National Packaging Covenant and beyond. The DEC has agreed to add plastic bags to the wastes for priority focus in the next 12 months.



Revised fact sheets presenting the most up-to-date information available to the DEC in relation to the assessment criteria for the priority wastes of concern are included in Appendix II.

## EPR instruments

The Consultation Paper identified some of the key instruments used when implementing EPR schemes, including take-back and deposit/refund schemes, advance recovery/disposal fees, levies and performance standards.

Forty-four submissions commented on the EPR instruments and a number of additional instruments were identified for consideration in the context of EPR schemes. In most cases, EPR instruments were discussed for specific products/wastes and these comments are detailed in Chapter 4 of this report.

The **Local Government and Shires Associations** supported the range of tools identified in the Consultation Paper but considered that there was a need to identify which mix of tools would reduce waste generation, and to assign responsibility to bring about the desired change. The submission said the appropriate tools would vary according to the product.

As noted in the previous section, 12 submissions supported the adoption of advance disposal fees or container deposit legislation as mechanisms for addressing some forms of packaging waste. These submissions suggested that advance disposal fees or deposits might be suitable for products such as batteries, carpets, chemical drums, ink cartridges, electrical goods and syringes. Four industry submissions opposed container deposit legislation. This issue is currently receiving consideration by the national Waste Working Group. See 'Community views' in Packaging in Chapter 4 for detailed comments.

It was noted that levies would need to be large enough to provide a deterrent to inappropriate disposal and combat the potential hazard. Other comments in relation to levies are discussed for particular wastes in Chapter 4 of this report.

One industry submission said that take-back schemes would not be effective if producers did not reuse or recycle the products. This organisation also thought that eco-labelling might not be effective. See 'Community views' in Packaging in Chapter 4 for more detailed comments.

Three submissions said EPR schemes should have appropriate funding and clearly identify the organisations responsible for their design and delivery. This would help to ensure that user-friendly collection services are provided to the public. In some cases, transitional funding would be needed to facilitate investment in the recycling of problem wastes.

Local councils suggested that advice on appropriate disposal sites for materials would be useful. One retailer also said they would need information on where to take collected items and compensation or incentives to meet their costs. This company said it would prefer to work with manufacturers to improve the recyclability of their products, as this might provide manufacturers with incentives to take back and reuse components.

Five submissions commented on the need to identify markets for recovered products with tyres, plastic packaging and wood waste specifically mentioned. It was noted that Resource NSW would have a role in developing these markets. Three other submissions advocated green procurement to promote increased government purchasing of recycled products and improve markets, particularly for waste tyres and tyre-derived products. They said the NSW Government should set mandatory targets for purchasing recycled-content products to create market demand as products made from secondary materials consume 95% less energy.

The possibility of promoting resource recovery through the use of tradeable certificates has been considered in relation to some products, notably tyres. This instrument is not readily understood and less complex instruments, such as product levies, tend to be preferred within the industry. However, three submissions said tradeable certificates should be considered.

**Global Renewables Ltd**, a company establishing a mechanical-biological treatment plant at Eastern Creek in Sydney, strongly advocated ‘sustainable resource certificates’<sup>5</sup> for materials of concern to provide incentives for their recovery and allow the transparent disclosure of recovery and diversion rates. It suggested that these certificates should target contaminants of the organic waste stream.

A submission from the recycling industry said financial support was needed to offset the technical and economic impediments to recycling. It advocated giving consideration to ‘sustainability certificates’ and advance disposal fees or levies. It noted that collection models vary and said the EPA and Environment Australia<sup>6</sup> should support collection trials to clarify costs, roles and responsibilities. It also said recyclers should be exempted from the waste levy as this added to their costs and tended to confine recovery to metropolitan areas. The revenue foregone should be recovered from producers of the wastes of concern. Alternatively, the levy could be rebated to recyclers who can demonstrate best practice.

Another recycling firm said that producers should pay for the disposal of residuals, including the waste levy. It said that advance disposal fees would improve recovery rates and ensure hazardous material is properly managed. For example, a bounty of \$10 on gas cylinders would allow \$5 to be paid on return and provide \$5 for the cost of degassing the cylinders.

Five submissions said that consideration should be given to recognising and rewarding industries that lead by example or promote effective reuse by transferring levy funds to them, providing tax concessions or subsidising certified recyclers.

Four submissions said that landfill charges should be increased to reflect the full cost of waste disposal and improve economies for recycling. One noted that this would require increased ‘watchdog’ activity to prevent illegal disposal. Another submission observed that landfill prices will increase over the next eight years as capacity diminishes and the waste levy increases. This will create pressure for more waste segregation and recovery. Another submission said the waste levy funds should be used to support the implementation of EPR.

Three submissions advocated compulsory levies or taxes on plastic bags to discourage their use. One submission proposed a \$500 end-of-life tax on vehicles at the time of purchase. Another submission advocated a recovery tax on imported furniture, imposed at the point of sale.

One individual suggested a ban on computers, televisions and tyres from landfill. Another proposed that all electrical products or products that produce hazardous waste should be banned from landfill. One industry group said the Australian Government should ban the import of tyres for purposes other than retreading.

In the DEC’s view it may be necessary to consider a mix of tools to achieve the desired outcomes when developing EPR schemes. While all of the instruments mentioned below have been used in relation to EPR schemes internationally, some are more suitable for consideration at the national than the state level. For example, some material taxes and levies cannot be imposed by a state government and industry would undoubtedly prefer any labelling requirements to apply across Australia. Each industry should consider the measures most appropriate to its needs, taking into account available technology, the structure of the industry, the type of waste and its environmental impacts, and the state of the resource recovery market.

The following instruments can be considered by industries and governments when developing EPR schemes:

- **advance recovery/disposal fees**, where a fee (generally paid at the point of sale) is levied on certain products to fund their collection, recycling, if possible, or appropriate disposal

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<sup>5</sup> Equivalent to ‘tradeable recycling certificates’ defined below

<sup>6</sup> Now the Department of the Environment and Heritage

- **cleaner production processes** to reduce the use of hazardous materials and adopt more sustainable production processes
- **compliance measures**, such as penalties for non-compliance with EPR schemes, material bans and/or restrictions or prohibitions on the disposal of certain products to landfill or to waste treatment facilities
- **deposit/refund schemes**, where a payment is made when the product is purchased, which is fully or partially refunded when the product is returned to an appropriate dealer or specialised treatment facility
- **eco-labelling**, where labels are placed on products or packaging to provide consumers with information about a product's environmental performance
- **education and awareness-raising** to promote community awareness about how to safely dispose of certain products/wastes or access EPR schemes
- **extended product ownership**, where the producer retains ownership of the product and leases it to consumers for use under certain conditions
- **green procurement**, where purchasing authorities aim to promote sustainable resource use, resource recovery and recycling through purchasing policies
- **incentives and rewards**, such as store discounts or other benefits, to encourage consumers to return goods to stores; subsidies to recyclers for effective reuse; grants to develop resource-efficient alternatives; or incentives to replace toxic materials
- **levies or taxes on particular materials**, such as taxes on virgin materials to discourage their use where recycled or recovered products would not be competitive on cost, or to provide funds to cover the cost of managing externalities, such as education, enforcement or clean-up of litter or illegal dumping or for the management of waste with problematic components
- **performance standards**, where targets are set, such as for minimum amounts of recycled content per product
- **product design**, such as adoption of the 'design for the environment' and 'design for disassembly' principles
- **take-back schemes**, where specific products or waste streams are taken back by the producer or returned to them for material recovery and recycling
- **tradeable landfill diversion certificates**, where a threshold diversion rate is set by the regulator and designated product manufacturers are required to hold certificates proportional to the volume/weight or value of their production within a set period and certificates are issued to reusers/recyclers based on net waste volumes processed that would be tradeable
- **tradeable recycling certificates**, issued to recyclers undertaking recycling and reuse activities, where a specified proportion of certificates must be purchased by producers (manufacturers and importers) during the accounting period based on the desired recovery and recycling rate.

## National or state action

A number of the wastes proposed for priority focus are currently being considered for action through Australia-wide schemes and the issue of whether EPR should proceed at the state or national level was raised in 24 submissions. Of these, 16 submissions specifically supported national action.

The industry and some local government organisations favouring national approaches did so because:

- isolated state action will increase the costs, complexity and inefficiencies associated with inconsistent waste management regulation
- it would not disadvantage states participating in financial incentives/disincentives programs
- it would create a level playing field and minimise the number of ‘free riders’
- it would ensure local manufacturers are not significantly affected by import and interstate competition
- Australian manufacturers have limited capacity to influence product design
- statewide schemes, especially mandatory schemes, are not likely to be effective, efficient or sustainable
- recycling facilities require national quantities of feedstock to achieve economies of scale
- demand needs to be created through taxation initiatives, such as for recycled office paper.

There are also constitutional and other legal constraints that preclude states from placing levies on the production or sale of products.

In general, national approaches were favoured to deal with electrical equipment, PVC and tyres. Industry also tended to favour national approaches in relation to packaging, but there was some support from environment and local government organisations for state action to address this waste.

Comments in relation to particular products are detailed in Chapter 4 of this report.

The **Total Environment Centre** congratulated the NSW Government for being the first Australian jurisdiction to introduce an EPR framework. They acknowledged the difficulties for industry in managing EPR on a state-by-state basis, but noted that it is often the case with new policies that one state leads and federal arrangements follow. They said NSW should not wait for a national solution and would receive strong community support for leadership.

The **Queensland Environmental Protection Agency** said they would benefit from a joint approach with NSW to industry on wastes of concern and would like to share resources and suggestions for management.

The question of whether national or state approaches to EPR should be pursued needs to be considered in the context of particular wastes of concern and national waste priorities and progress. *Extended Producer Responsibility Priority Statement 2004* outlines the DEC’s proposals in relation to each waste of concern.

## Criteria for evaluating EPR schemes

The Consultation Paper sought comment on criteria for evaluating whether the actions taken by industry to reduce the impacts or volume of waste were sufficient to preclude regulatory intervention by the Government.

Thirty submissions commented on methods to evaluate EPR schemes and the following criteria were suggested:

- percentage of signatories to voluntary schemes or producers/manufacturers participating in the scheme (some said there should be no ‘free riders’ at all, others suggested 80% industry participation after five years)
- percentage of residents/businesses aware of and participating in the scheme

- level of reduction in the total volume of the waste
- percentage or volume of waste diverted from landfill
- reuse/recycling rates or quantity of waste recovered
- extent of redesign to reduce toxicity, avoid waste or promote resource recovery
- level of recycled content
- reduction in environmental/health impacts or toxicity through the use of alternative materials or other means
- level of reduction in illegal dumping or littering
- efficiency of transport networks for recovery
- ease with which consumers can dispose of products safely
- level of community concern about the waste
- extent to which producers meet the actual costs of collection and disposal of products
- impact on production costs and international competitiveness
- social costs and benefits of EPR schemes
- extent to which targets set have been achieved within agreed time frames.

Several submissions said the evaluation should include transparent time-lines for achieving targets, and independent monitoring and reporting. Assessment criteria would need to be determined in the context of specific schemes.

Other points made were:

- Recovery targets (60+%) could be ramped up over 3–5 years in line with international best practice.
- Recovery targets should be set for specific materials and rates should, for example, be higher for tyres than for computers/televisions.
- As a product-based tool, EPR should embrace more than landfill avoidance. Waste to land, water and air during the life cycle of the product all need serious consideration when developing EPR schemes.
- Clear targets and time frames should be specified and linked to sanctions. The National Packaging Covenant, for example, has ‘poorly defined outcomes, time-lines and consequences for non-achievement of plans’.
- Any voluntary scheme should have monitoring and review systems that can be audited to accurately measure outcomes against agreed goals and targets.
- The NSW Government may need to support voluntary schemes by developing and promoting recycled-content products; developing and maintaining reuse and recycling guides; developing infrastructure for recovery, recycling and exchange of wastes of concern; product labelling about recycled content or disposal options; and banning certain wastes to landfill or alternative waste treatment facilities.
- Industry should be given every opportunity to meet the performance standards within a time frame that does not generate unnecessary costs.
- Schemes should assist market development.
- Consideration should be given to existing disposal, reuse and reprocessing options and infrastructure, particularly in regional areas. The EPA should assess the impact of implementing EPR in both urban and rural areas.

- There should be links between EPR and cleaner production with incentives for reduced use of hazardous materials and penalties for products with components made from heavy metals and other toxics.
- Progress with EPR will be difficult and all the benefits should be brought to the public's attention.

These suggestions have been refined and classified by the DEC into measures for efficiency, effectiveness, equity and administrative feasibility. See *Extended Producer Responsibility Priority Statement 2004* for details.

## Regulatory EPR schemes

There was a diversity of views on whether mandatory regulatory schemes should be implemented. Local government and environment groups tended to favour regulation, while industry supported voluntary approaches (although not in all sectors). Those favouring regulation said:

- Undue emphasis has been given to a step-by-step approach in which time and resources are spent raising awareness before mandatory schemes are introduced. Industry has been on notice for over a decade.
- The EPA should save time by recommending mandatory action on EPR. There are too many conditions before EPR can be enforced.
- The EPA should take a stronger and more regulatory approach to EPR.
- The EPA should publish annual reviews of current schemes to provide triggers for mandatory action.
- To be effective, EPR schemes will need to be mandatory. Voluntary schemes have been inconsistent in their make-up and attract free riders.
- All EPR schemes should be mandatory and tax reductions given to firms participating in genuine initiatives.
- More information is needed on the actions that would be considered at each step of the process, if waste management practices do not meet these criteria.
- Regulation is necessary to promote economies of scale and deter free riders.
- Schemes should be mandatory and failure to comply should attract significant penalties. Producers of waste should not continue to enjoy a competitive advantage over responsible companies. Mandatory schemes should initially focus on the most problematic wastes, in terms of quantity/toxicity.
- Industries should develop their own benchmarks but there should be a regulatory safety net in NSW for those that do not participate in voluntary schemes similar to the National Environment Protection Measure for Used Packaging Materials. See 'Packaging waste' in Chapter 4 for details.

Those against mandatory regulatory schemes said:

- Carrots and sticks are needed, not just sticks at the end of a long process.
- It is unclear how any mandatory EPR scheme would be integrated with existing voluntary and legislated initiatives.
- EPR regulations should only be applied after a scientific assessment of the impacts demonstrates that there would be an improvement in environmental outcomes.

- Regulatory measures would drive up costs and consumers would seek cheaper options not covered by EPR schemes.
- Schemes should be evaluated by sectoral working parties before defining possible regulatory options.
- EPR regulations should aim to achieve improved environmental outcomes and not be punitive. NSW should not attempt to leapfrog international product design.
- Regulation is not supported where voluntary product stewardship schemes are in place. Voluntary approaches are preferred because of their flexibility, capacity to influence the whole supply chain and ability to promote best practice and continuous improvement.

## Expert Reference Group

The Consultation Paper proposed establishment of an Expert Reference Group (ERG) to advise the DEC and the Minister for the Environment on the development, implementation and evaluation of progress in relation to EPR schemes.

Pending community input, the composition of the ERG was not specified in the Consultation Paper. Thirteen submissions commented on the role and composition of the proposed ERG and made the following points:

- The **Australian Tyre Recyclers Association** said the ERG should have strong representation from recycling, government purchasing and enforcement bodies and 'hands-on' knowledge of the objectives of EPR or product stewardship schemes.
- **Hunter Residents Against Sydney Garbage Dumps** warned that the composition of the ERG was a potential point of weakness and that members needed to be familiar with world best practice. The ERG should not contain industry association representatives as they would have a conflict of interest in evaluating progress, but must include one community representative to keep the process transparent.
- According to the **Beverage Industry Environment Council**, the process for establishing the ERG had not been clearly defined so it was unclear whether all stakeholders would be represented or it would have sufficient technical and EPR experience. Stakeholders should be consulted on its composition.
- **Clean-Up Australia** said the ERG should be responsible for consumer education on which packaging can be recycled, incentives to recover packaging in public places, and government investment in plastics recycling and packaging reuse.
- The **Waste Crisis Network** submission believed that the ERG should have equal representation of environment, community, local government and industry sectors. Industry representatives should have a demonstrated commitment to waste reduction. It should be independently chaired with the minutes recorded using secretarial support from the EPA.
- The **Nature Conservation Council** said that funding should be provided for small- to medium-sized enterprises to make direct representation to the ERG and for consumer groups to participate in EPR dialogues in relation to product return procedures, environmental claims and product liability implications. The EPA should report annually on failed voluntary programs and provide a blueprint for Government-led action.

The following sectors or organisations expressed an interest in being represented on the ERG:

- Local government, through the Local Government and Shires Associations
- Australian Tyre Recyclers Association
- Plastics and Chemicals Industries Association

- Waste Crisis Network
- Nature Conservation Council.

The DEC is establishing an Expert Reference Group to advise it and the Minister on the implementation and evaluation of effective EPR schemes. *Extended Producer Responsibility Priority Statement 2004* has details on its role and composition.



## 4. Comments on wastes of concern

This chapter deals with the feedback received on each of the wastes of concern nominated in the Consultation Paper. Many of the submissions were quite lengthy and only the key points have been summarised below, although all comments have been taken into account. The views outlined are those of the identified author, not the DEC.

The DEC's advice to the Minister on the action that should be taken to manage these wastes over the next 12 months is outlined in *Extended Producer Responsibility Priority Statement 2004*.

### Used tyres

#### *Why are used tyres a waste of concern?*

An estimated 170,000 tonnes of waste tyres are generated in Australia each year, equivalent to around 18 million passenger tyres. Of these, over 50% end up in landfill and a small but significant number continue to be disposed of inappropriately, such as through illegal dumping (EPHC 2002, p.1).

The DEC has reviewed its estimates of waste tyres in consultation with the tyre industry. As NSW accounts for 30% of vehicle registrations (ABS 2002),<sup>7</sup> the State is likely to produce approximately 51,000 tonnes of waste tyres each year. Retreads are the reuse of highest value for passenger vehicle tyres, but demand has been declining since the introduction of the Goods & Services Tax, which increased their price relative to new tyres. Retreads also eventually require recycling or disposal.

In NSW, it is estimated that 11,000 tonnes of tyres (22%) are crumbed for use in consumer products (such as rubber mats and carpet underlay), asphalt, bitumen and building products. A number of these applications have the potential for significant growth. The crumbing process results in some residual waste, which is sent to landfill. Industry claims that around 8000 tonnes (16%) of used tyres are exported from NSW. A further 3000 tonnes (6%) are used in civil engineering and building. The industry believes that less than 1% of tyres are illegally dumped and about 5% are illegally stored.<sup>8</sup> The remainder, approximately 25,500 tonnes or 50%, are disposed of to landfill in NSW.<sup>9</sup>

Used tyres persist in the environment. Stockpiles of tyres in particular have potentially adverse environmental impacts and pose a threat to public health and safety. Because of their chemical make-up, burning tyres are extremely difficult to extinguish and cause severe air pollution. A fire at a retail tyre outlet in Sydney in 2002 caused the hospitalisation of people from surrounding areas due to respiratory concerns. Other problems include pollution in the runoff of water used to fight tyre fires, chemicals leaching from dumped tyres and solid waste management problems caused by whole tyres in landfills.

Tyres have good resource recovery potential and used tyres are suitable for management by EPR schemes.

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<sup>7</sup> Previously, the EPA estimated the NSW share of waste tyres on the basis of population share (36%), not share of registrations (30%).

<sup>8</sup> The DEC is currently investigating five sites in Sydney involving a total of 700 tonnes of tyres that have been illegally dumped or stored. This equates to 1.4% of waste tyres in NSW. Illegal storage/dumping has occurred in other parts of the State and smaller scale dumping is managed by local councils. The size of illegal dumps/stores can vary significantly from year to year.

<sup>9</sup> The disposal of whole tyres is banned in the Sydney Metropolitan Area/Extended Regulatory Area. Tyres are subject to regulatory controls on the transport, storage and processing of large quantities of tyres and to prevent burning and dumping.

The Environment Protection and Heritage Council (EPHC) released *A National Approach to Waste Tyres: Policy Discussion Paper* in October 2002 for comment. Details of the approach are outlined under 'Current action' below.

### *Community views*

Submissions received by the EPA on the Consultation Paper generally agreed with the nominated wastes of concern, including used tyres as an area for priority focus. Thirty-seven submissions specifically commented on used tyres. Of these, three suggested that used tyres should not be a priority.

**Sydney Catchment Authority (SCA)** supported the immediate introduction of a mandatory EPR scheme for used tyres. Illegal dumping of used tyres remains a problem for SCA and the councils within its catchment. In its view, attempts by the tyre and motor vehicle industries to take voluntary action to manage waste tyres have failed and the conditions for mandatory EPR for waste tyres appear to apply already. This was supported by one individual submission which also proposed a ban on the landfilling of tyres and no production of energy-from-waste tyres.

The **National Parks and Wildlife Service (NPWS)** said it would support any initiatives to reduce illegal dumping of waste on its reserves, including tyres, which is a common problem in the remote areas of parks. Removal and disposal is costly for the NPWS and site-specific leaching of contaminants into the surrounding environment occurs over long periods. Dumped tyres also create hazards for firefighters during hazard reduction operations.

**Gosford City and Wyong Shire Councils** suggested that evaluation criteria for EPR schemes could include the percentage of waste diverted from landfill, and this should be higher for tyres than for computers and televisions.

**Port Stephens Shire Council** believed the current low level of resource recovery for tyres requires immediate attention.

**Marrickville Council** said used tyres were a real problem. The council does not pick up used tyres as part of garbage or general clean-ups because the local waste transfer station refuses to take them and there are no economically viable disposal options nearby.

**Wollondilly Shire Council** said a number of tyre outlets were involved in the 2002 Christmas bushfires and the disposal of burnt material after tyre fires was a problem.

**Riverina Eastern Regional Organisation of Councils** reported that it had investigated recovery options and found that, despite a number of innovative technological solutions, few have reached commercial viability and many lack funding. They supported a levy/fee, funded by tyre manufacturers, to help pay for research and development (R&D) on the disposal of tyres with the fund retaining a portion of the intellectual property rights.

The **Local Government and Shires Associations** said tyres lend themselves to an effective EPR scheme as they are generally surrendered at tyre-fitting premises, which can serve as return depots. Most tyre-fitters already include a 'disposal charge' or 'environmental levy' on customer invoices, which is a mechanism to centrally collect funds that could be applied to waste reduction initiatives, such as R&D for rubber crumb applications, etc. Because of the level of imports and cross-border movements, a national approach may be required to target both local and overseas manufacturers. It is essential to give tyre manufacturers clear and substantial responsibility for undertaking or funding R&D into markets for used tyres.

The **NSW Tyre Recycling Council**, which was established under the discontinued Tyre Industry Waste Reduction Plan, was concerned with the orderly disposal of tyres. It had put in place a successful tracking system under the plan, which it felt should be reinstated. The council believed that manufacturers and importers should not be responsible for used tyres as they pass through too many hands; the end user should be responsible for tyre disposal.

**Ecoflex Australia** has a patented waste tyre recycling system that converts waste tyres into a range of building products. They believed the vast majority of waste tyres could be profitably recycled using their system with environmentally safe and beneficial outcomes.

Ecoflex supported a national weight-based levy as a short-term measure, while new technologies are gaining acceptance. The levy would be paid on all new tyres to fund activities directed at commercialising recycling systems. Levy funds should be paid to government rather than a 'producer responsibility organisation'<sup>10</sup> as this would add to costs and tyre producers have not demonstrated their support for recycling. Ecoflex said that a levy is not needed to cover the costs of collecting, storing and distributing tyres but could be used to fund enforcement and auditing. The Australian Environmental Labelling Association could independently verify the environmental credentials of those seeking levy funds. Recycling systems with high diversion rates from landfill and higher value uses should be preferred.

Ecoflex also wanted increased government testing and purchasing of recycled waste tyre products. They believed that public sector purchasing policy should require government to purchase at least 40% of recycled waste tyre products.

**Rubber Recycling Pty Ltd** said the capital investment for tyre recycling is high and success would require sophisticated knowledge of the industry, engineering, R&D and marketing ability. It believed a levy was not needed to fund market development, but could be used to track tyres. Any tyre levy should be a short-term device to stimulate demand. Rubber Recycling advised that consumers currently pay a levy at the point of disposal, although this has no formal basis. Reducing disposal to landfill requires the encouragement of value-added products and a government/industry board should be established to promote recycling. Tyre-derived fuel is a low-value recycling outcome which would require transport subsidies. Higher value-added products should be preferred. The firm considers that pyrolysis is not a viable solution to reducing the landfilling of tyres.

A submission from **ANRUB Products and Services Pty Ltd** outlined the potential for using rubber crumb in mining explosives. ANRUB said tyre crumb could replace the diesel fuel component of the mining explosive, ANFO, and would be more cost-effective if the latter was not subsidised by the diesel fuel rebate. According to ANRUB, several million tyres could potentially be diverted to this application.

**Devote Pty Ltd** said the existing informal structure for recovering waste tyres was efficient. Illegal disposal was minimal and government intervention should be directed at enhancing regulatory activity. Investment in new recycling capacity did not require government intervention. Centralised control and the creation of a levy fund would not improve resource recovery and would add to consumer costs. Increased landfill levies would improve economies for recycling but require greater watchdog activity to prevent illegal disposal. A small manufacturer/importer levy was supported by Devote if the funds could be directed to increased tyre tracking and enforcement, rebates to recyclers, subsidies for collection from remote locations and funds for public education and national marketing strategies.

The **Australian Tyre Recyclers Association (ATRA)** was formed in April 2003 to represent the collective interests of the major tyre recyclers in Australia. Their recovery systems apply to civil engineering, sport, leisure, playground and road resurfacing, industrial adhesives and blending with virgin materials. ATRA supported the need for safe and efficient systems for recycling and believed opportunities exist to expand the use of rubber crumb and the reprocessing of tyres in a range of construction applications. ATRA regarded the incineration of tyres for energy recovery as commercially marginal and requiring subsidies to be competitive. ATRA wanted to facilitate a nationally consistent approach and cautioned NSW against taking isolated action as this would increase costs and inefficiencies.

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<sup>10</sup> 'Producer responsibility organisations' have been established in a number of EPR schemes overseas to manage levy funds and take-back arrangements for producers, through an independent, non-profit organisation.

ATRA thought there was scope for a voluntary scheme but that a mandatory levy was inevitable. It supported a national weight-based levy on all new tyres paid at source, collected from manufacturers and importers, and controlled by a government agency, with funds used to enforce legislation and develop and commercialise alternative recycling systems. Levy funds should specifically cover:

- a national audit and waste tracking system delivered by state environment agencies similar to the systems operating in Queensland and South Australia
- rebates to recyclers to encourage cheaper recycling
- rebates for end-use manufacturers competing with virgin products
- clean-up of tyre dumps
- education
- market development through government buying strategies.

ATRA proposed that the State Government should enforce existing tyre disposal laws and require full cost recovery for landfill disposal.

The ATRA submission was fully endorsed by **C&R Tyre Recycling Pty Ltd**, which was concerned to ensure that the collection and storage of tyres was not undermined by amateur and illegal operators. This required enforcement of transport, storage, recycling and disposal rules.

The **Motor Traders' Association of NSW (MTA)** said any legislation should reduce opportunities for unscrupulous operators to bypass laws and dispose of tyres unacceptably and also promote the use of tyre waste and products using recycled tyres. 'Used tyre operators' should be strictly defined and they must have the capacity to use the tyres they collect and store. It would not be desirable for a monopoly to be set up using funds collected by the EPA or any other body. There should be transparency in the administration of any fund with proceeds used primarily for the purposes for which they were collected.

In relation to the proposed national approach to waste tyres, the MTA said that a take-back scheme is the only viable option. The scheme must be mandatory; targets should be set (but not in a way that would increase costs) and reviewed regularly; all tyres, except those exported, should be covered; there should be no impediments to retreading; and governments should ban the import of tyres for purposes other than retreading and take a strong enforcement role. Levies should be paid by all manufacturers and importers and managed by a joint government/industry board. The size of the levy needs to be determined in the light of costs and benefits, and fees should be transparent. A 'producer responsibility organisation' was supported if it would achieve the highest level of compliance. Tradeable certificates should be given careful consideration.

The **Federation of Automotive Products Manufacturers** supported the approach to waste tyres of the **Australian Tyre Manufacturers Association (ATMA)**. ATMA made a submission to Environment Australia but not to the EPA. Briefly, this submission supported an industry-managed voluntary levy applied to all new tyre casings, both manufactured and imported. The levy would be used to support tyre collection, R&D on improved recycling, and education. Government regulation would be required to cover free riders.

The **NSW Minerals Council** did not support a levy-benefit scheme for wastes tyres as the costs would be passed on to consumers. It said there was no justification for a levy on large mining tyres used in rural and remote locations, as a weight-based levy would fall heavily on mining and agricultural interests without achieving good coverage or environmental outcomes. These tyres are usually managed using environmentally acceptable burial under regulatory controls and site consents. EPR policies should be directed at passenger tyres. The council supported using tyres for energy-from-waste and believed tyre-derived fuel should be included in the Greenhouse Benchmarks Scheme and promoted through reductions in load-

based licence fees. NSW should have energy-from-waste tyres included in the Mandatory Renewable Energy Targets through tax concessions or other means. Using shredded tyres for stemming in mine blasting has the potential to consume a large proportion of waste tyres, but the costs remain above landfill charges. Queensland's licence requirements for managing waste tyres are preferred to those in NSW, where the waste management framework is complex and prescriptive and can be applied inconsistently across regions.

The **Cement Industry Federation** is committed to reducing the use of fossil fuels by finding alternative energy sources in waste materials, especially used tyres, industry by-products and waste oil. Australian cement manufacturers already use 45,000 tonnes of waste material per annum at kilns in Victoria and Queensland, primarily used tyres, waste oils and solvents. The federation believes the industry has the capacity to use 30,000 tonnes of used tyres in NSW.

A coordinated national approach was needed, involving all those in the supply chain and this would take some years to implement fully. The strategy should ensure only non-toxic waste material is available for use in these applications and that waste streams were reasonably homogenous in physical form. A national approach would reduce costs for industry by removing conflicting waste management and regulatory regimes. Waste materials should not be disposed of to landfill or incinerated unless options for recycling, reuse and use as an alternative energy or material source had been commercially exhausted. The cost of capturing waste and transporting it should be met by those responsible for creating the waste with policies minimising re-treatment and beneficiation costs. Levies should be payable for a limited period and not prop up unsustainable industry.

The federation believed the cement industry could play a transitional role in minimising the disposal of waste tyres but that government needed to remove uncertainties by guaranteeing that specified quantities of homogenous waste streams would be available for two to three years. This would ensure returns on investment and compensation where materials are diverted to other streams. Each cement plant has different requirements and capacities. The use of alternative fuels does not increase the production of dioxins. The federation supported a national approach to making energy from waste, along the lines being developed by the Waste Management Association of Australia (WMAA 2004). On average, cement plants would need to receive between 80 cents and \$1.20 per tyre at the gate for feasible resource recovery.<sup>11</sup>

A submission from an individual said that he had developed a system to reuse tyres in agricultural infrastructure that harvests water and nutrients from plants grown on the system. He suggested that recycling fees could go into the regeneration of degraded lands and the system could dispose of 20 million tyres and produce 1 million tonnes of pulp annually. A pilot scheme is under way.<sup>12</sup>

**Clean-Up Australia** noted that used tyres can be used to construct pavements, retaining walls and roadways, and for erosion control. They supported reusing waste tyres for construction purposes using the Ecoflex process as this is a higher value reuse than crumbing or incineration for fuel.

The **Total Environment Centre** identified tyres as a waste of concern because they create serious difficulties for waste management. However, in their view, tyres should not be a priority as they are already subject to some form of voluntary initiative and do not present an immediate or direct threat to human health or safety.

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<sup>11</sup> In July 2003, the EPA varied the licence held by Blue Circle Southern Cement for its cement kiln at Berrima to permit a 12-month trial of the use of alternative fuels, including used tyres, as a possible method of reducing emissions. The kiln is limited to processing 5000 tonnes of used tyres during the trial. In January 2004, the company sought a variation to its development consent to allow the kiln to burn 25,000–30,000 tonnes of tyres per annum.

<sup>12</sup> Tenterfield Council has given development approval, subject to conditions on tyre storage and regular reporting on tyres received and processed, and independent water quality testing.

The **Waste Crisis Network** said dumped used tyres are visually unappealing but not toxic to plants and animals and should be given lower priority than other more hazardous wastes. The waste treatment firm, **Global Renewables Ltd**, also said household hazardous waste and batteries were more significant contaminants of solid waste than tyres.

The **Australian Council of Recyclers** supported EPR for wastes such as tyres to make producers responsible for recovering products containing toxic or hazardous substances that may place a burden on their end-of-life management. One recycling firm said shredded tyres perform better in landfill because they do not harbour mosquitoes or float to the surface. Another company said it planned to establish a recycling plant in the Hunter region targeting tyre waste and was keen to pursue recycling of used tyres.

**Waste Service NSW** believed that 25% of waste tyres were illegally disposed of or inappropriately stored before disposal. They suggested that the former Industry Waste Reduction Plan should be examined to determine why it was not effective and how EPR would differ from the earlier approach. It is important that financial incentives were provided to develop markets for recycled used tyres.

**Coles Myer** said it understood the Government's concerns about the four priority wastes and was taking steps to address them. Kmart Tyre and Auto pays collection and recycling companies between 55 cents and \$1.50 a case to collect 600,000 units of tyres annually. These were recycled into retreads, playground equipment and sometimes used in the production of cement.

The **Australian Industry Group** believed the NSW Government should focus on the development of consistent national approaches to tyre waste. Their submission claimed that EPR for waste tyres could have an adverse impact on the economics of end-of-life vehicle recycling, without specifying how.

The **Australian Environment Business Network** suggested planning laws created impediments to waste management infrastructure, such as burning waste tyres in cement kilns. They believed that criteria should be developed for the acceptance of treated or special types of waste for use in areas and products outside landfills. Some of these areas were energy-from-waste, including permitting and upgrading cement kilns to accept wastes, and the reuse of wastes in building, other non-residential and infrastructure products.

The **West Australian Department of the Environment, Water and Catchment Protection** said their wastes of concern were similar to those in NSW, including waste tyres, and it would support any initiatives toward a national approach.

The **Victorian Environment Protection Authority** advised that it would continue to work with all jurisdictions to give priority to various wastes, including tyres.

### *Tyre Industry Waste Reduction Plan*

Some submissions called on the EPA to outline the reasons for the failure of the Tyre Industry Waste Reduction Plan (IWRP), which was gazetted in June 1998 under the *Waste Minimisation and Management Act 1995*. The IWRP contained industry commitments to establish infrastructure and data collection mechanisms in the first 18 months (Stage 1), to divert tyre waste from landfill by 50% in the following five years, and by 75% within another five years (Stage 2).

The IWRP required used tyre operators who bought, sold and transported specified quantities of the waste in NSW to register with the Tyre Industry Waste Management Council and to comply with tracking requirements. This aimed to facilitate the collection of accurate data on the tracking of used tyres across, into and out of NSW; identify where tyres were being dumped; and help create a climate for the responsible environmental management of used tyres.

The council required used tyre operators to register with it at a cost of \$215 per annum. These fees were intended to fund implementation of the plan's commitments, including the development of an industry code of practice, education programs for consumers and industry members, a used tyre tracking scheme and programs to develop the wider commercial use of tyre-derived products. The council was expected to assist operators with marketing and establishing networks.

The definition of 'used tyre operator' proved controversial since it determined who was bound by the IWRP, who had to register with the council, and who had to use the proposed tracking system. The original definition included council landfill operations, bringing objections from local government which said it was not part of the tyre industry. After months of negotiation, the definition was amended. However by then, planning momentum had stalled.

Three years into the plan, there was little sign of achieving its targets. Fewer than half of the 'used tyre operators' in NSW had registered with the council with about 900 refusals, despite EPA warnings that action would be taken against them for contravening the IWRP. To be successful, the plan required a very competitive industry with low profit margins to share commercial information (through the tyre council) and behave in a coordinated and cohesive fashion. However, the EPA became aware of a lack of trust within the industry about the confidentiality of information and application of funds.

When the *Waste Avoidance and Resource Recovery Act 2001* was introduced, all IWRPs, except the one on used packaging materials, were discontinued as they were considered ineffective.

The second reading speech on the Waste Avoidance and Resource Recovery Bill noted that the major problems with the IWRP approach were that it:

- did not provide a sufficiently transparent process for determining when mandatory approaches should be considered
- did not provide comfort to industries doing the right thing that they would not be included in a mandatory approach
- thwarted Government action where industry was not meeting plan commitments.

Accordingly, the Bill replaced the IWRPs with new arrangements based on the successful international experience with EPR, which allowed industry to initiate approaches to reduce problem wastes and specified the circumstances in which mandatory schemes could be considered.

### *Current action*

Environment Ministers have identified waste tyres as a priority national waste issue. In October 2002, the Environment Protection and Heritage Council (EPHC) agreed to release *A National Approach to Waste Tyres: Policy Discussion Paper*, which set out three main policy options:

- a take-back approach (mandatory or voluntary)
- a levy-benefit scheme (mandatory or voluntary)
- a tradeable certificates system (mandatory).

The paper also briefly discussed some complementary policy options such as marketing, R&D and awareness-raising.

Twenty-eight submissions were received in response to the paper within the three-month consultation period, which ended in February 2003. The submissions were evaluated as part of the development of a national strategy for waste tyres. The majority of these submissions

(16) supported a national approach to waste tyres. Sixteen submissions favoured a levy/benefit scheme, with only one opposed. Only two supported tradeable certificates and eight opposed this approach.

Meetings between key industry representatives and Commonwealth and State Government officials were held in June, August and December 2003 and February 2004 to assist industry in its development of a product stewardship scheme for used tyres. A draft framework has been prepared by tyre manufacturers, importers, retailers and recyclers, which recognises waste tyres as a problem and proposes a levy as the preferred instrument to fund additional recycling.

Details of industry's preferred approach are still to be finalised and will be considered by the EPHC at its April 2004 meeting.

## Computers

### *Why are computers a waste of concern?*

It is estimated that 5000 tonnes of computers are disposed of to landfill every year in NSW. Modelling of industry figures by Meinhardt Infrastructure and Environment Group (Environment Australia 2001a) estimated that nationally by 2006 there would be 1.6 million computers disposed of to landfill nationally, 1.8 million sent to storage (in addition to the 5.3 million already in storage) and 0.5 million recycled.

Computer components, such as lead, cadmium and flame retardants, can have adverse impacts on human health and the environment. For example, mercury can leach out when circuit breakers are destroyed and metallic mercury is able to vaporise, adding to air emissions. Lead in waste computers can dissolve in acidic ground water and contribute to heavy metal leakage from poorly managed landfills. Despite collection and treatment of leachate at controlled landfills, contaminated sludge is still being landfilled.<sup>13</sup> Hazardous components in computers can also limit opportunities for material recycling and waste treatment.

The rapid obsolescence of electronic equipment is inefficient, as is the use in their manufacture of non-renewable resources that cannot be readily reused or recycled. There is some illegal dumping of obsolete computers.

A number of initiatives are under way to improve recovery and recycling of computers but more work is needed in this area and there is a need for products to be designed with fewer hazardous components.

### *Community views*

Submissions on the Consultation Paper generally agreed with the nomination of computers as an area for priority focus, with two exceptions: the Nature Conservation Council and the Australian Information Industry Association. Twenty-eight submissions specifically commented on computers. The views on computers of the **Australian Electrical and Electronic Manufacturers' Association** are consolidated with the organisation's comments on televisions in that section of this report.

One individual said the best way to recycle computers was to refurbish them for community groups like the Scouts and that this should be organised on a grand scale. Another individual submission argued that computers should be the subject of a mandatory scheme and landfilling of them banned. Sustainable product design should be encouraged and markets

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<sup>13</sup> The hazard characteristics of waste electrical and electronic equipment, including the risks associated with landfilling and recycling, have been extensively documented in Europe. See Commission of European Communities (2000).



created for recycled computers and components. A third individual noted that cathode ray tubes (CRTs) would pose problems for producing energy from waste in terms of emissions. He suggested that proposals to incinerate mixed residual waste should be firmly rejected.

The **Waste Crisis Network** said that when putrescible waste is combined with batteries and computers it produces a lethal leachate.

The **Nature Conservation Council** (NCC) recommended identifying CRTs as a priority product in their own right, rather than the computers and televisions which contain them. The NCC noted that company-wide collection and reprocessing had been trialled in NSW, reprocessing technology was viable, CRT technology about to be replaced, and producer responsibility for CRTs could be crafted to support local computer re-manufacture, refurbishment and repair operations. Bans to NSW landfill could be applied if voluntary diversion programs failed.

The **Total Environment Centre** (TEC) identified waste electric and electronic equipment, including computers, televisions, video display units, NiCads and other batteries, as 'Priority Group 2: Hazardous waste'.<sup>14</sup> The TEC said this group of products should be redirected out of the domestic waste stream with EPR the fairest, most equitable solution to the problem. These products were grouped together because electrical products increasingly use small computer chips and circuitry that contain hazardous materials. They are also resource-rich. By grouping them under one banner, the TEC felt more confident that no toxic or resource-rich items would 'fall through the cracks'. The TEC said that a take-back scheme would be an ideal tool for sectors, such as the business computing market, to create a stable scheme, with the home-user market being plugged in at a later date.

Local government was generally supportive of computers as a priority waste of concern.

**Southern Sydney Regional Organisation of Councils** said EPR needs to relate to clearly defined products and noted that many, such as computers, are made up of composites.

**Gosford City and Wyong Shire Councils** believed the definition of computers should include printers and scanners.

**Wollondilly Shire Council** said, with old photocopiers, computers and word processors being regularly left at council tips, computers and associated hardware should have priority focus.

**Port Stephens Council** said computers and televisions can have impacts for alternative waste treatment systems, which the council is keen to support and believed the two wastes should be combined.

**Marrickville Council** reported there had been a significant increase in computers being dumped and put out in household clean-ups, with many less than four years old. The council gets many inquiries on how to safely dispose of computers.

**Riverina Eastern Regional Organisation of Councils** said consumer information is needed on where to dispose of old computers and retailers should take them back for use by community groups. The costs of a statewide collection campaign should be met by industry with a levy based on the units sold.

**Maitland City Council** supported electrical equipment receiving priority focus.

The **Local Government and Shires Associations** supported the use of EPR for computers to reduce planned obsolescence. Manufacturers should be required to arrange take-back services and explore opportunities to retro-fit existing computers. The increasing use of flat screen and

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<sup>14</sup> The TEC proposed giving priority to two categories they identified as 'Priority Group 1: Toxic and biological products that represent a direct and serious risk to public health and safety' and 'Priority Group 2: Hazardous waste that normally ends its life in the hands of the general public'.

liquid crystal display (LCD) may overcome issues related to the use of hazardous materials in CRTs, but during the transitional period these will continue to be discarded in high volumes.

The **National Parks and Wildlife Service** said general waste, including computer components, is frequently dumped on park lands. Removal is costly and time-consuming and there can be impacts on scavenging wildlife.

The **Australian Food and Grocery Council** said the environmental costs of EPR need to be considered. For example, discouraging the use of household computers could result in increased car travel, postage and reduced access to information.

A **computer retailer** said he was disgusted at the quantities of computer components that are dumped. Monitors are landfilled because spare parts are only required to be available during the warranty period and are priced to discourage repair. He said making spare parts available at reasonable prices would reduce landfilling.

A community group that recycles donated computers, **Charity Computers**, said despite the significant amounts of hazardous substances in computers, large quantities are being landfilled. It estimated one million computers, 1.5 million printers and 38,000 kilometres of cabling are landfilled annually in Australia, containing over 1000 tonnes of lead and other carcinogenic compounds. Charity Computers said that Australia is in the Basel Action Network's 'Hall of Shame' for exporting toxic e-waste to non-OECD countries. The most efficient point in the life cycle of a product to solve a toxic waste problem is at the point of manufacture. However, as most of our computers are imported, overseas companies would need to change their methods. Placing a redeemable cash value on components would give consumers an incentive to return them to retail outlets or certified EPR locations. Eco-labelling and education could help to promote understanding about leachate problems. Enviro-tolls on all new computers sold after 2004 could cover the cost of refunds for all computer peripherals, subsidies to recyclers who pass a certification process, transport to recycling plants and consumer education on e-waste toxicity.

The **Australian Information Industry Association**, which represents over 370 companies, believed industry had a shared responsibility to manage the environmental impacts of their products from design to disposal, but the approach must be voluntary. The association felt that EPR would have significant cost and market implications and a case had not been made that it was the most effective tool for addressing computer waste. Before computers are made a priority, the EPA should:

- undertake further research on the environmental and health impacts of computers entering landfills
- consider current industry initiatives and the impact of international strategies, non-branded computers and orphaned products on Australian schemes
- analyse the Recycle IT! pilot program to inform the development of voluntary recycling schemes (see 'Current action' for details).

The association proposed that, rather than introducing EPR schemes, the State Government should set clear and measurable objectives for the industry. The EPA should acknowledge current industry initiatives, including the report *Designing for the Environment* (Australian Information Industry Association 2002), which provides strategies and examples of how to reduce the environmental impacts of products. Member companies had established specialist take-back schemes, which have demonstrated the need for cost-effective collection programs and the lack of viable markets for materials, such as plastics and leaded glass. There is limited product design in Australia but following the EU Directives (see 'Current action' below) would reduce the environmental impact of computers.

The association believed the EPA needs to:

- clearly define what computer products are being targeted

- create a level playing field for all companies using regulations to minimise the number of free riders
- recognise that unbranded computers account for up to 52% of desktop computers sold in Australia so the producer cannot be readily identified
- acknowledge that orphaned computers<sup>15</sup> are likely to account for over 50% of the waste stream.

The association felt the existing companies should not have to bear the cost of managing orphaned products. EPR schemes could substantially increase costs at a time when profit margins are being eroded and there is limited market advantage from environmental leadership. It has been estimated that compliance with the EU *Waste Electrical and Electronic Equipment Directive* has increased costs to computer vendors by 1%. Local computer manufacturers could be affected significantly and take-back is not likely to be cost-effective for small- to medium-sized firms. A national approach is preferred to state-based regulation.

**IBM Australia** advised that it has a long-standing commitment to environment protection and product stewardship and cleaner production. IBM has extensively studied the problems associated with the disposal of Information Technology (IT) equipment and recognises that manufacturers have a role in developing improved recycling infrastructure. IBM's Environmentally Conscious Products Program established stringent standards for environmental design and prohibited the use of a range of hazardous substances. Take-back has been offered since 1989 overseas. Schemes vary from country to country but all require participation by product users or last equipment owners to help cover costs, either through end-of-life disposal fees paid by the last user or a visible fee on new product sales. Free take-back would be prohibitively costly as collection costs are approximately US\$15–20, excluding administrative costs. To be effective, schemes should have the following attributes:

- collection of products from households and small businesses through existing municipal waste collection (to avoid duplication)
- industry-wide solutions for transportation, recycling and disposal of waste IT financed by a visible fee on new sales (as advance disposal fees are likely to be opposed by some stakeholders)
- the recycling fee to be based on product type or weight
- separate take-back of IT from other consumer electronics as the latter are likely to be older and harder to recycle
- take-back costs for orphaned products to be met from fees on new sales.

IBM said voluntary schemes would be more effective than regulatory schemes, but if legislation became necessary, it should be national as state schemes would add to complexity and costs for industry.

The **Office of Fair Trading** (OFT) noted the intention to give industry an opportunity to voluntarily reduce waste in the first instance. Their experience is that without a legislative requirement many traders would not comply with the standards and will supply the cheapest product, whether or not it conformed with environmental or other principles. The OFT administers the *Electrical Safety Act 1945*, which ensures that electrical articles plugged into mains meet national and internationally agreed standards. These relate mainly to safety, but the OFT commented that the EPA may wish to become more actively involved to ensure that the standard-making process addresses environmental issues in the composition and labelling of products. Imported products generally comply with international standards but small importers would need to be encouraged to comply with EPR principles.

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<sup>15</sup> 'Orphaned products' are those manufactured by companies that have gone out of business.

**Coles Myer** said, in relation to take-back schemes, that they would not have storage for bulky items, like computers and televisions. These schemes would require new operational procedures that could affect customer service and add to the costs for storage, transport and sorting.

**HMR Central Processing Facility** advised that it had opened a CRT crusher in Melbourne in June 2003 capable of processing 300 tubes per hour. The company is considering opening a central processing facility in Wagga Wagga. The company is able to process 97% of electronic waste types although some items, such as plastic with flame retardants, still cause problems. HMR worked on the western Sydney Recycle IT! pilot.

**Global Renewables Ltd** said that batteries and household hazardous waste are more significant contaminants of municipal solid waste than tyres, computers and televisions.

The **Australian Council of Recyclers** supported EPR to make producers responsible for recovering products containing toxic or hazardous substances that may place a burden on their end-of-life management, such as electronic equipment. These currently required sophisticated technology to disassemble and needed to be redesigned using substitutes for hazardous components.

**Waste Service NSW** said it could act as an agent and facilitator for EPR schemes with their drop-off recycling services becoming a key component of infrastructure to support EPR initiatives. The success of the western Sydney pilot program for recycling computers should be evaluated.

The **West Australian Department of the Environment, Water and Catchment Protection** said their wastes of concern were similar to those in NSW, including computers, and they would support any initiatives towards a national approach.

The **Victorian Environment Protection Authority** said there are significant opportunities to work together to promote voluntary arrangements and establish cooperative regulatory mechanisms to underpin such schemes. Cooperation would be essential to achieve necessary change in key national product markets, such as electronics. They will continue to work with all jurisdictions to give priority to electrical products, among other wastes.

### *Current action*

In 1999 major electrical equipment associations approached the Australian and New Zealand Environment and Conservation Council with a proposal to develop a national product stewardship scheme for their products. Since then progress in developing an acceptable scheme has been slow.

In October 2002, the Environment Protection and Heritage Council (EPHC) identified electrical waste as a priority waste and sought more rapid progress from the industry in delivering waste avoidance and resource recovery outcomes. The national Waste Working Group, established by the EPHC, has been progressing this issue, with the NSW EPA as the lead agency.

The European Parliament in October 2002 agreed on two directives on electrical equipment which have since become operational. The European Union (EU) *Waste Electrical and Electronic Equipment Directive* promotes electrical products that are designed for easy repair, upgrade, reuse and dismantling, and safer recycling (EU 2002b). Article 5(5) requires all member states to achieve by 31 December 2006 a minimum recovery rate of 4 kilograms per individual per year.

The EU *Restriction of Hazardous Substances in Electrical and Electronic Equipment Directive* bans the use of lead, mercury, cadmium, polybrominated biphenyls (PBB) and polybrominated diphenyl ethers (PBDE) in electrical equipment from 1 July 2006 (EU 2002a).

## **Industry meetings**

The EPA met with representatives of the electrical industry in February 2003 to outline its approach to EPR and seek industry feedback. Key points made by industry at the meeting were:

- Australia has a limited role in product design. The two EU Directives have been under continual discussion in Australia and will dictate future trends. It would be preferable for Australia to conform to European design standards rather than develop its own.
- There is a question about whether the priority focus should be limited to computers and televisions. While the heavy metals in cathode ray tubes are a particular problem, all electrical products present similar waste challenges and the EU is adopting a common approach.
- Industry would prefer a partnership approach, with regulation providing a safety net for any voluntary scheme and capturing free riders. Industry would prefer to set any levy as a regulated levy would be too inflexible. The levy should be visible to consumers and separate from the product price.
- Any product or landfill bans should operate at the national level.

In May 2003 senior officers of the EPA and Environment Australia<sup>16</sup> met with chief executive officers of leading electrical companies to discuss options for accelerating industry action on establishing a product stewardship program. Meeting delegates agreed that it would be sensible to adopt EU design standards and were willing to consider the possible adoption of international product stewardship models in Australia. Some companies represented at the meeting advised that they were already participating in schemes developed in the Netherlands, Canada and Japan, and agreed to look at these as a priority. A second meeting was held in September to secure industry commitment to the development of computer and television recycling and recovery plans.

Member companies of the Australian Information Industry Association are now considering options for the cost-efficient recovery of computer waste and will report to the EPHC in April 2004 on their proposed product stewardship arrangements.

## **Recycle IT! pilot**

A 22-week pilot computer collection program in western Sydney run by the Australian Information Industry Association, HMR Recycling Group and Resource NSW netted 6383 computer parts weighing a total of 56.9 tonnes. This included 2195 monitors, 1627 central processing units, 817 keyboards and 773 printers.<sup>17</sup>

Preliminary analysis showed that a significant amount of the collected material could be reused, while the remainder could be dismantled and processed for components and recyclable materials, including metals, plastics and glass.

## **Barriers to Recovery Project**

In June 2003, Environment Australia and Resource NSW contracted Nolan-ITU, in conjunction with the Centre for Design, RMIT and Product Ecology Pty Ltd, to study the barriers to the recovery of electrical and electronic equipment, particularly computers, peripherals and televisions. Its objective was to develop options for all the components of the recovery process, including collection, reprocessing, funding, management and policy development.

Stakeholders from all parts of the product supply and value chains provided input to the project consultation team drawn from Environment Australia and the DEC.

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<sup>16</sup> Now the Department of the Environment and Heritage

<sup>17</sup> Resource NSW, Presentation to NSW Waste Management Conference and Expo, 5 June 2003

The study identified a range of barriers to the collection and reprocessing of electrical and electronic products, which could be classified into technical, financial, commercial, collection logistics, geographic and regulatory. Following an analysis of the options to overcoming the barriers, the study recommended a National Electronic Products Recovery Program (DEH & DEC in press), including setting up a 'producer responsibility organisation', managed and funded by industry. The study suggested that government could act as an adviser and possibly consider implementing national regulation to encourage full industry participation and deter free riders.

### **Dell computer recycling program**

In June 2003 Dell commenced a recycling program for the environmentally friendly disposal of used personal computers in partnership with the HMR Recycling Group. The service is offered in all Australian capital cities. Depending on the age, condition and configuration of the used equipment, cash rebate vouchers may be available for redemption against previous or new Dell purchases.

## Televisions

### *Why are televisions a waste of concern?*

Industry advises that 1.2 million televisions are sold annually in Australia and that 120,000 of these are made locally.<sup>18</sup> It is estimated that between 5000 and 15,000 tonnes of televisions are disposed of to landfill in NSW each year. New technology associated with the move to digital televisions in 2008, flat screens and home theatres may accelerate disposal of older and superseded sets in the medium term. Televisions are commonly dumped when people move house.

Circuit boards, standby batteries and the glass in cathode ray tubes (CRTs) contain hazardous materials, such as lead, cadmium, mercury and chromates, that may have an adverse impact on human health and the environment when televisions are disposed of, or limit opportunities to recover and recycle materials. The average CRT television screen contains two kilograms of lead (although this is decreasing) and this could contribute to leakage of heavy metals from poorly managed landfills. Brominated flame retardants are commonly used in the plastics and on printed circuit boards.

The rapid obsolescence of televisions is inefficient, as is the use in their manufacture of non-renewable resources that cannot be readily reused or recycled.

### *Community views*

Submissions received on the Consultation Paper generally agreed with the nomination of televisions as an area for priority focus. Seventeen submissions specifically commented on televisions. Key points are summarised below.

The **Nature Conservation Council** said CRTs should be included as a priority in their own right, rather than computers and televisions.

The **Total Environment Centre** believed televisions should be grouped in waste electrical and electronic equipment and given second priority for redirection from the waste stream. 'Community views' in Computers has more details.

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<sup>18</sup> Industry estimate provided at Consumer Electronics Suppliers Association meeting with EPA, 20 March 2003

One individual said that CRTs would pose problems for energy-from-waste initiatives because of emissions. He suggested that proposals to incinerate mixed residual waste should be firmly rejected.

Another individual called for bans on the disposal of televisions to landfills and on imports that are made from non-recyclable materials. Televisions should also be subject to a tax to promote environmental design.

One individual said the focus should be on consumer electronics, rather than televisions, to achieve economies of scale.

**Gosford City and Wyong Shire Councils** said the television product category should be widened to include radios, videos and compact disc players.

**Port Stephens Shire Council** suggested computers and televisions could have impacts for alternative waste treatment systems so they should be combined into one category.

**Marrickville Council** reported that large numbers of televisions are put out in general clean-ups. These and computer monitors have the potential to cause occupational health and safety incidents from broken glass.

**Riverina Eastern Regional Organisation of Councils** said old televisions should be returned to retail outlets when new televisions are purchased and the manufacturer of the new set should meet the disposal costs of the old, as the producer may no longer be in business. They requested information on the Victorian pilot collection scheme (see 'Current action' below).

The **Local Government and Shires Associations** believed there was a clear case for EPR for televisions to reduce planned obsolescence. Manufacturers should be required to arrange take-back services. The increasing use of flat screen and liquid crystal displays (LCD) may overcome issues related to the use of hazardous materials in CRTs, but during the transitional period these will be discarded in high volumes.

The **Australian Electrical and Electronic Manufacturers' Association** and the **Consumer Electronic Suppliers Association** jointly offered to make available the results of EcoRecycle Victoria's pilot television collection scheme. They suggested that the waste stream for electrical and electronic goods should be analysed using pilot projects to determine whether individual products were amenable to some form of EPR by either the supplier or some other party in the supply chain. The priority areas appear to be appropriate but may need to be refocused after reviewing the results of the pilot projects. The final waste streams need to take into account toxicity, volume and the practicality of recycling.

The associations could not say whether EPR was the most effective tool for addressing this waste stream as they believed that three of the four criteria identified in the Consultation Paper for effective EPR were not widely applicable to the Australian market, which predominantly imports consumer electronics. These three criteria were:

- a clearly identifiable producer
- a well-structured or organised industry sector
- a capacity to influence the whole supply chain.

The associations suggested that if the 'producer' is taken to mean the importer/supplier, rather than the manufacturer, there were a number of concerns:

- it is increasingly difficult to identify the party responsible for placing a product on the market and the effectiveness of EPR will diminish as the share of major brand owners diminishes
- action during the design and manufacturing phase will not be possible in the majority of cases

- the consumer electronics sector is highly organised, but the personal computer and small appliance sector is more fragmented
- the capacity to influence the whole supply chain is low in Australia as there is limited leverage over upstream impacts during design and manufacture of products and downstream influence over wholesale and retail business is not amenable to EPR.

The associations proposed steps that could be taken to reduce the risk of ineffective EPR programs, including:

- EPR could operate on an 'approved scheme' basis, where proposals would be submitted to the EPA for review and authorisation
- a safety net regulation could be adopted to support the approved schemes to ensure all importers, distributors and manufacturers participate
- an appropriate enforcement mechanism would support participation in approved schemes
- EPR and the safety net regulation should be national policy
- adoption of standards should be tied to similar markets, such as the European Union.

**Coles Myer** said in relation to take-back schemes that they would not have storage for bulky items, like computers and televisions. These schemes would require new operational procedures that could affect customer service and add to costs for storage, transport and sorting.

'Community views' in Computers outlined the role of **HMR Central Processing Facility** in recycling televisions and CRTs; the view of **Global Renewables Ltd** that products other than televisions are more significant contaminants of municipal solid waste; and the view of the **Australian Council of Recyclers** that EPR is appropriate for electronic equipment. The comments of the **Office of Fair Trading** in relation to electrical standards and of the **Victorian Environment Protection Authority** in relation to electronics are also relevant to televisions.

### *Current action*

Current developments in relation to product stewardship for electrical and electronic equipment are outlined in detail under 'Current action' in Computers.

In addition to meeting with representatives of the electrical industry in February 2003, the EPA met with the Consumer Electronics Suppliers Association (CESA) in March to discuss options for EPR. The following issues were raised at the meeting:

- Developing separate schemes for different products may lead to additional sorting and information costs, such as explaining various schemes to consumers. An extended time frame would be needed to deal with all electrical products.
- Several companies have already started removing lead solder.
- A national scheme is preferred and NSW could promote successful voluntary initiatives through national processes.
- The Commonwealth needs to identify who is importing televisions to ensure there are no free riders as industry will not participate unless the scheme covers all manufacturers and importers.
- Any levy should be applied at the point of production or import, rather than the point of sale, and should be visible to consumers.
- Importers who are not members of an approved scheme should pay an additional levy.
- Tradeable certificates might be an alternative to a levy.



### **Victorian brown goods recovery trial**

EcoRecycle Victoria, in conjunction with the Australian Electrical and Electronic Manufacturers' Association (AEEMA), CESA, MRI Australia Pty Ltd, Leastwaste and the Centre for Design at RMIT, conducted a trial recovery program for brown goods (televisions and video recorders) from November 2001 to March 2002. It involved five transfer and recycling centres (owned by both local government and privately) across five eastern Melbourne municipalities with a population of 652,000 people.

An important aim of the trial was development of a program which could be rolled out progressively across all regions and states, both strategically and economically.

The pilot sought to explore methods to collect and process televisions and investigate existing and potential processing opportunities. It also attempted to establish the indicative cost of recycling as this will be essential to the development of any long-term commercial program.

The pilot program resulted in the diversion from the waste stream of 1452 televisions, 870 television parts, 14 stereos and 383 video recorders (AEEMA, EcoRecycle Victoria & CESA 2003).

### **Draft Strategic Plan for Televisions**

In December 2003, CESA and AEEMA submitted to government for consideration a draft strategic plan for a collective product stewardship approach for Australian electrical and electronic products. The draft plan proposed establishment of an independent producer responsibility organisation to develop and implement a national collection, promotion and processing scheme, commencing with televisions. Jurisdictions are working with industry representatives to finalise details of the plan for consideration by the Environment Protection and Heritage Council in April 2004.

## **Nickel cadmium batteries, excluding mobile phone batteries**

### *Why are NiCad batteries a waste of concern?*

*[Other batteries have been dealt with under the category of Household Hazardous Wastes.]*

Rechargeable nickel cadmium (NiCad) batteries are used extensively by both industry and households to provide portable, long-life, low-cost power systems. NiCad batteries have been used in mobile phones, cordless phones, desktop and laptop computers, cordless drills, shavers and video cameras. They are also used for communications equipment, emergency lighting and emergency power for medical equipment and hospitals.

A total of 8.5 million NiCad batteries were imported into Australia in 2002, of which 3.9 million were installed within an appliance. It is estimated that 3.3 million NiCad batteries were sold in NSW in 2002. Imports of NiCad batteries declined sharply in 2002 following an earlier steady decline of 10% between 2000 and 2002. This decline is primarily because both laptops and mobile phones no longer use them. In 2002, it was estimated that 2047 tonnes of NiCad batteries were imported into Australia (EPA 2003b). The number of NiCad batteries disposed of to NSW landfills is difficult to estimate but is thought to be around 500 tonnes.

NiCad batteries are composed primarily of nickel, cadmium, steel and graphite. The most toxic component of NiCad batteries is cadmium, which may cause environmental and health problems if batteries are disposed of inappropriately, such as being damaged or burnt. Batteries with less toxic constituents, such as lithium and nickel hydride, have been substituted for NiCad batteries in portable computers and mobile phones. Alternatives have not yet been developed for high-power applications like power tools and dust busters, but are anticipated.

The recoverable materials are cadmium and nickel-iron scrap, which account for 76% of the weight of NiCad batteries and plastic accounting for 4%.

The presence of heavy metals, such as cadmium and nickel, may create a barrier to the recovery of other materials or energy in facilities using composting or energy-from-waste processes because they can contaminate potential organic products and generate air emissions. Cadmium is a major pollutant in soils, where it may be taken up by plants and enter the food chain. It bioaccumulates as it moves up the food chain. Cadmium can also be washed into surface and ground waters, causing damage to aquatic ecosystems.

### *Community views*

Submissions received on the Consultation Paper generally agreed with the nomination of NiCad batteries as an area for priority focus. Fifteen submissions specifically commented on NiCad batteries.

The **National Parks and Wildlife Service** reported that general waste, including batteries, is frequently dumped on their land and EPR could assist in reducing the dumping of batteries.

The **West Australian Department of the Environment, Water and Catchment Protection** and **Maitland City Council** said the wastes for priority focus, including NiCad batteries, were consistent with their priorities.

**Hornsby Shire Council** agreed with the areas for priority focus but was unclear about the extent of the problem with batteries.

**Marrickville Council** believed the community generally understands that NiCad batteries need to be dealt with differently. The council receives many inquiries on how to dispose of them safely and currently advises the public to stockpile them until a safe solution is found.

**Port Stephens Shire Council** acknowledged that NiCad batteries could pose problems for alternative waste treatment processes. It believed the community is concerned about the disposal of all batteries and suggested a broadening of the category.

**Eurobodalla Shire Council** said related products should be integrated, such as mobile phones and NiCad batteries, and industry encouraged to form partnerships for their collection and recycling.

Members of the **Riverina Eastern Regional Organisation of Councils** supported the introduction of a scheme similar to one operating in the United States where legislation requires battery recycling and labelling, and equipment designed to allow the easy removal of batteries.

Given the value of the metals in NiCad batteries and their potential toxicity, the **Local Government and Shires Associations** felt there was a clear case for an EPR scheme. The associations said the only responsibility currently taken by producers of NiCad batteries is to encourage 'thoughtful' disposal of them or warn against their inclusion in household waste. They consider this irresponsible, as appropriate, accessible disposal options do not exist for householders.

The **Waste Crisis Network** said cash-back deposits could be used for products like batteries, carpets, ink cartridges, whitegoods, etc. **Hunter Residents Against Sydney Garbage Dumps** also felt that batteries would lend themselves to a take-back scheme.

The **Total Environment Centre** (TEC) identified waste electric and electronic equipment, including computers, televisions, video display units, NiCad and other batteries, as Priority Group 2: Hazardous waste, one of two priority groups suggested. The TEC said this group of products should be redirected out of the domestic waste stream and EPR is the fairest, most equitable solution to the problem.

One individual noted that inappropriate disposal of NiCad batteries would pose problems for generating energy from waste. **Global Renewables Ltd**, which is establishing a mechanical-biological waste treatment facility at Eastern Creek, said the facility would be more effective if contamination was minimised and priority focus should be given to batteries and Household Hazardous Wastes. These are more significant contaminants of municipal solid waste than tyres, computers and televisions. They felt the assessment criteria for wastes of concern must include the potential for contamination of other materials in the waste stream and the potential to interfere with resource recovery.

For **Waste Service NSW**, the greatest potential impact from NiCad batteries is on leachate in landfills.

It is notable that while the EPA sent the Consultation Paper for comment to 76 battery retailers in NSW, none responded. Ten of the largest companies and organisations involved in the supply or use of batteries were invited to participate in a meeting with the electrical industry in February 2003 and only Energizer Australia attended. At this meeting it was noted that consumers needed to be educated about which batteries contain toxic materials. There was some support for a take-back scheme based on a deposit levied at the time of purchase. It was felt that the retail sector would be prepared to cooperate in battery take-back schemes because batteries are small and do not require significant storage. This is borne out by the Australian Mobile Telecommunications Association (AMTA) scheme for the take-back of mobile phones and batteries, which has 1800 retail stores and repair centres acting as collection points Australia-wide (AMTA 2003a).

At the Consumer Electronics Suppliers Association meeting in March 2003, industry members suggested that consumers would not be able to distinguish NiCad batteries from other batteries and there would be additional costs in sorting them, especially as NiCad battery use is declining.

### *Current action*

While there is support for EPR in relation to NiCad batteries, there is no local battery manufacturers' association that could facilitate producer responsibility for this product.

One possible option would be for AMTA to extend the scope of its current mobile phone and battery take-back scheme. The participating members in this scheme include the four phone carriers (Optus, Orange, Telstra and Vodafone), the service providers (AAPT and Virgin Mobile) and the handset manufacturers (Alcatel, Ericsson, Motorola, Nokia, NEC, Panasonic, Sagem, Samsung, Siemens and RF Industries). Some of the handset manufacturers also produce electrical appliances using NiCad batteries. Since 1999 AMTA has collected 61 tonnes of batteries, including 32.5 tonnes of batteries containing cadmium (AMTA 2003b). NiCad batteries are no longer used in mobile phones, although there would still be old stock with NiCad batteries awaiting collection.

The EPA met with AMTA in March 2003 and raised the question informally. Their scheme currently charges battery wholesalers 13 cents per battery to recover and recycle them. The EPA had further talks with AMTA in August to discuss whether it would be prepared to extend the coverage of its scheme on a voluntary basis. AMTA indicated that it was prepared to raise the issue for consideration by its Board, on the basis that any costs associated with the recovery of non-mobile NiCad batteries would be fully recovered from battery distributors. The association is assessing an indicative per gram cost for NiCad battery recycling as a starting point for discussions with industry.

Battery World, which operates a franchise network of 100 stores across Australia, offer their customers a recycling service for the first two categories below and is developing a recycling service for the last two:

- lead-acid batteries, typically used in automotive, marine and deep cycle applications: recycled free of charge unless a freight cost is involved for remote locations
- cellular phones and their batteries: recycled free of charge as Battery World is a member of the AMTA scheme
- other rechargeable batteries with NiCad, nickel hydride or lithium cells: to be recycled on a cost per kilogram basis
- other battery technologies that typically involve specific hazardous handling procedures: advice to be provided on whom to contact to arrange recycling.

A difficulty in making progress on this issue was the lack of data on this waste stream, which was compounded by a lack of industry input. The EPA therefore engaged a consultant to compile information on:

- the number of NiCad batteries sold annually in NSW
- the number of NiCad battery importers in Australia and NSW
- the range of NiCad applications and which applications are in decline
- the extent to which manufacturers and importers would be willing to subsidise the costs of a take-back scheme and the preferred method, such as levy, advance disposal fee, tradeable certificate
- the extent to which retailers would be prepared to support take-back of NiCad batteries, particularly outside the scope of the current AMTA scheme for mobile phones (EPA 2003b).

Some of the key findings of the study have been included in ‘Why are NiCad batteries a waste of concern?’

There is currently no manufacture of NiCad batteries in Australia. Eight major importers of NiCad batteries have been identified. The use of NiCad batteries in shavers and video cameras is expected to decline by approximately 10%–15% each year. The use of NiCad batteries in cordless phones and cordless drills is expected to remain stable. This means there is likely to be a significant number of NiCad batteries entering the waste stream over the next five years and a recovery program is needed for at least the next 10 years to capture the batteries currently being used and disposed of.

Importers have indicated that they would be willing to participate in an industry-based product stewardship scheme to recover NiCad batteries provided it is funded by a levy at the retail outlet to cover the cost of collection and reprocessing. Importers believe that such a levy should be visible to consumers.

An issue with this waste stream is that any EPR action would inevitably result in the transfer of hazardous waste offshore. Mobile phone batteries are exported under Commonwealth permits for hazardous waste. The *Societe Nouvelle D’Affinage Des Mateaux* (SNAM) manages the specialist bath smelting procedure that is the basis for the recycling of nickel cadmium and nickel metal hydride batteries. SNAM meets the European Union’s vigorous environmental standards and currently provides the most cost-effective recycling service available to Australia.

## Agricultural/veterinary chemicals

### *Why are agricultural/veterinary chemicals a waste of concern?*

Unwanted stocks of agricultural/veterinary chemicals may pose serious risks to the environment and human health. For example, organochlorine pesticides can persist and accumulate in animals and plants, others are highly mobile and can move or leach into surface and/or ground water, while others are persistent in soils and sediment. Pesticide contamination of primary produce could have a serious impact on international trade. Misuse or accidental exposure to pesticides may affect human health.

Complete data on the use of agricultural/veterinary chemicals is not available, although a report by the Australian Academy of Technological Sciences and Engineering estimated that 5000 tonnes of organophosphate insecticide is used in Australia every year (Australian Academy of Technological Sciences and Engineering 2002, p.vii).

A national program funded by the state and Commonwealth governments, called ChemCollect, has provided for the collection, storage and destruction of hazardous, unwanted and unregistered agricultural/veterinary chemicals. The scheme commenced in NSW in mid-2000 and collections ceased in December 2002. In NSW, 521 tonnes of unwanted agricultural/veterinary chemicals were collected under the program, together with another 106 tonnes of household chemicals<sup>19</sup> as a number of councils encouraged the surrender of household chemicals at the same time. In 1999, industry agreed to replace ChemCollect with its own scheme, called ChemClear.

### *Community views*

Submissions received on the Consultation Paper generally agreed with the nominated wastes of concern, with 13 commenting specifically on agricultural/veterinary chemicals.

One individual suggested that this category should be combined with agricultural/veterinary chemical containers.

The **Total Environment Centre** (TEC) nominated agricultural and veterinary chemicals and containers as one of the highest priorities because they represented a serious risk to public health and safety. The TEC said this product group produces both known hazards, such as biological material or persistent organic pollutants, as well as risks of unknown magnitude, such as endocrine disruptors. In the case of unknown risks, the TEC believed the precautionary principle demanded the inclusion of these chemicals in the EPR Priority Statement. The TEC submission said it was critical that the producers of these highly problematic wastes were responsible for disposing of them as their understanding of the manufacturing process best qualified them to handle the threats posed by disposal or reuse. EPR schemes would either encourage manufacturers to develop safer alternatives or continue to bear the full financial responsibility for the costs of dealing with any by-products, such as dioxins, generated during product disposal.

While **Holroyd City Council** reported that farm chemicals were not a waste of concern for it, **Northern Inland Regional Waste** nominated them as a priority waste in its area.

**Riverina Eastern Regional Organisation of Councils** was very concerned about what appeared to be procrastination by industry in implementing ChemClear and felt it should be pressured to fulfil its commitments. While significant amounts of waste material were disposed of under ChemCollect, more material remains to be collected in their region.

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<sup>19</sup> Waste Service NSW, Presentation to NSW Waste Management Conference, 5 June 2003

The **Local Government and Shires Associations** were concerned about the slow progress of the voluntary ChemClear scheme and said the industry needed clear guidance on desired outcomes and deadlines. Avcare should be put on notice that the Minister has the power to introduce a mandatory EPR scheme in the absence of an effective voluntary scheme.

**Waste Service NSW** believed the transition from ChemCollect, which it managed in NSW, to ChemClear would be very important. It noted that the 600 tonnes of chemicals collected under ChemCollect included about 100 tonnes of household chemicals.

**Sydney Catchment Authority** said improvements to post-consumer management of agricultural chemicals within its catchment would assist it as a consumer and regulator and reduce the potential detrimental impact such chemicals may have on the catchment when they are used incorrectly.

**Sydney Water** also reported that it would benefit from better management of agricultural/veterinary chemicals as these can enter both wastewater and drinking water systems, affecting water quality and the efficiency of water treatment. Organophosphate pesticides are the main waste of concern affecting both sewage quality and biosolids. With no information available on their correct disposal at the point of sale, they are still being detected in effluent. However levels of organochlorine pesticides are diminishing in sewage as they are no longer on sale.

**Hunter Water Corporation** generally agreed with the criteria for assessing wastes of concern but said that wastes that have a longer term impact, such as pesticides, should be weighted more heavily.

**NSW Agriculture** supported industry initiatives for the collection of farm chemicals. It acknowledged the success of the ChemCollect scheme and looked forward to the timely introduction of the industry's ChemClear scheme. The department said the EPA should outline the criteria against which the performance of this scheme would be monitored over the next 12 months. NSW Agriculture supported the setting of annual performance targets for ChemClear with industry given every opportunity to meet these new standards within an appropriate time frame and through mechanisms that did not generate unnecessary costs for producers.

In its submission, **Avcare** gave no further information on the commencement of the ChemClear scheme, except to say that it would support the timely implementation of the EPR principle, through stewardship programs like ChemClear. It also said direct promotion of ChemClear by local councils would assist in promoting its adoption.

The **Victorian Environment Protection Authority** said it would continue to work closely with other jurisdictions to maintain, evaluate and improve national product stewardship programs, such as that for agricultural/veterinary chemicals.

### *Current action*

The industry association for agricultural and veterinary chemical manufacturers (the National Association for Crop Production and Animal Health known as Avcare) and the National Farmers' Federation agreed in 1999 to develop and implement a scheme called ChemClear to collect and safely dispose of unwanted chemicals.

It was on the basis of industry's commitment to exercise its responsibilities through ChemClear that government agreed to deliver the ChemCollect scheme at a cost of \$27 million, including \$8.66 million provided for NSW by the State and Commonwealth Governments. Industry has had the benefit of two years' experience from ChemCollect to help it prepare for the ChemClear scheme.

Members of the national Waste Working Group have been concerned about the slow progress by industry in implementing ChemClear. In September 2002, the Commonwealth Minister for

the Environment and Heritage wrote to the industry partners urging them to confirm their commitment to the timely implementation of ChemClear. Responses by signatories to the ChemClear Agreement indicated that all parties were committed to a smooth and cost-effective implementation of the program by January 2004.

The EPA wrote to Avcare in May 2003 seeking details for inclusion in this report on the extent and nature of the pilot collection and the proposed date for its commencement. The ChemClear Advisory Committee agreed in July that Agsafe<sup>20</sup> would implement ChemClear in the first instance, beginning with a trial at two locations in NSW from October 2003 before a progressive roll-out of the full program in 2004.

## Agricultural/veterinary chemical containers

### *Why are agricultural/veterinary chemical containers a waste of concern?*

Agricultural/veterinary chemical containers that have not been properly rinsed have the potential to introduce pesticides into the environment if not disposed of appropriately. Pesticides are designed to control pests, usually by killing them, so they are likely to have significant capacity to affect the environment or human health on contact. This is of particular concern in rural areas where pesticides are used intensively.

In Australia, it is recommended practice to triple-rinse or pressure-rinse emptied pesticide containers and pour the rinsate into the spray tank to ensure that very little, if any, pesticide remains in the container. Farm chemical containers have been identified as a waste of concern because of their potential environmental and public health impacts if improperly disposed of, their high volume, and the good potential for beneficial resource recovery and management by EPR or product stewardship schemes.

The National Farmers' Federation, the National Association for Crop Production and Animal Health (Avcare), the Veterinary Manufacturers and Distributors Association, and the Australian Local Government Association jointly developed the national drumMUSTER program to collect and recycle empty, cleaned, non-returnable crop production and on-farm animal health chemical containers. The parties are signatories to a national Industry Waste Reduction Agreement, which has set targets to:

- recover 66% of clean, empty, rinsed chemical containers through drumMUSTER
- reduce the weight of chemical container waste going to landfill by 68%, compared with 1990
- supply 50% of raw materials in recyclable or returnable packaging.

Containers recycled through drumMUSTER are used to make recycled products such as garbage bins, outdoor furniture, roadside posts, drainage and irrigation pipes, railway sleepers and fences.

### *Community views*

Submissions received on the Consultation Paper generally agreed with the nominated wastes of concern, with 13 commenting specifically on agricultural/veterinary chemical containers.

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<sup>20</sup> Agsafe is an industry initiated co-regulatory stewardship program for Avcare members to support risk management and workplace safety practices by individuals at production and distribution sites. All Avcare members must participate in Agsafe, which is a fully owned subsidiary company of Avcare governed by a Board with representatives of Avcare, the National Farmers' Federation, the Veterinary Manufacturers and Distributors Association and an independent Agsafe representative.

**Sydney Catchment Authority** said improvements to post-consumer management of agricultural chemicals within its catchment would assist it as a consumer and regulator and reduce the potential detrimental impact such chemicals could have on the catchment when they are used incorrectly.

The **National Parks and Wildlife Service (NPWS)** reported that used pesticide and herbicide containers were a potential issue for it, although they can be disposed of responsibly through drumMUSTER. NPWS felt the adoption of a deposit on used chemical containers to encourage returns would reduce waste. The program should encourage local recyclers to collect drums regularly, rather than in an annual collection where hazardous containers are stockpiled for long periods.

The **Total Environment Centre (TEC)** nominated veterinary and agricultural products, chemicals and containers for inclusion in their Priority Group 1: Toxic and biological products that represent a serious risk to public health and safety. See 'Community views' in Agricultural/veterinary chemicals for TEC's detailed comments on the treatment of this group of wastes.

The **Royal Botanic Gardens** said it had found drumMUSTER limited both in terms of the range of containers involved and information about the scheme and it was unclear which organisation was responsible for coordinating it.

**NSW Agriculture** supported industry initiatives for the collection of farm chemicals and containers. The department noted that drumMUSTER had achieved a high level of recognition in the farming sector and driven greater awareness of container management issues in the chemical manufacturing industry. This has led to packaging and product innovations, such as refillable bulk containers and non-liquid formulations, including dispersible or soluble granules. NSW Agriculture was uncertain whether these innovations had delivered a net benefit in terms of the number of containers in the marketplace that still required collection, recycling and disposal.

NSW Agriculture also felt the industry needed to develop a more strategic approach to the drumMUSTER scheme, starting with an assessment of the total pesticide container waste stream. This would better align capacity with demand and help identify any structural impediments to the waste management process that could be addressed by government or industry. It would also provide a basis for getting stakeholder agreement on some annual performance targets for the scheme. Industry should be given every opportunity to meet any new performance standards in an appropriate time frame and through mechanisms that did not generate unnecessary costs for producers.

**Anabranch Investments Pty Ltd** noted that, currently, there is no incentive for manufacturers to adopt 20-litre refillable containers because it is cheaper to purchase new containers and pay the drumMUSTER levy to take care of their collection and disposal. The company advised that 2.3 million plastic 20-litre containers were used by the agricultural/veterinary chemical industry in 1999. Of these, only 180,000 (7.5%) were reused, a significant drop from the 234,000 (11.2%) reused in 1997 (ANZECC 2000). The company said mechanisms were needed to develop and adopt new technology that reduced annual consumption of single-use 20-litre containers.

The **NSW Farmers' Association** said 110-litre reusable closed-loop envirodrums with a life span of five years were an important component of the chemical container waste reduction program. In March 2003, two chemical companies introduced a \$19.80 levy for cleaning the 110-litre drums and an 18 cents per litre levy on other refillable containers.<sup>21</sup> The association was concerned that the levies would reduce the affordability and cost-effectiveness of

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<sup>21</sup> These industry charges are separate from the drumMUSTER levy, which applies only to non-returnable or single-trip containers. Despite a \$100 deposit on refillable containers, farmers are not returning them promptly and the charge aims to cover the cost of transporting and reconditioning these containers.



agricultural chemicals supplied in the refillable containers and may result in farmers reverting to the single-use 20-litre containers, with obvious environmental implications. The association reported that the National Farmers' Federation has had initial discussions with the relevant manufacturers in an attempt to ensure the viability of the refillable container program while not imposing unreasonable costs on farmers.

**Holyroyd City Council** said farm chemical containers were not a waste of concern in its area, while **Wollondilly Shire Council** reported that the drumMUSTER collection had not been particularly successful in the shire.

**Riverina Eastern Regional Organisation of Councils** strongly supported drumMUSTER but said only 15%–20% of containers were being returned locally and more needed to be done. In its view, the program did not provide sufficient funds to cover advertising costs<sup>22</sup> and surplus levy funds should be used to raise awareness and extend the program's coverage to a broader range of containers.

The **Local Government and Shires Associations** noted that the drumMUSTER program had attempted to voluntarily address the large quantity of chemical containers in the marketplace and fully reimburse councils for their involvement in the collection and processing of drums. While it is a good model, two matters require consideration:

- The low return rates (25%–30%) indicate that many farmers are not using the service and levy funds are in surplus. Offering farmers a refund of 4 cents per litre would provide a financial incentive to encourage drum return.
- Industry signatories to the Industry Waste Reduction Agreement have not honoured commitments to move away from medium-concentration liquid chemicals towards granulated products, high-concentration liquid products and the increasing use of refillable drums, such as envirodrums, etc. An additional levy placed on refillable drums to cover the costs of their cleaning and refilling has reduced their competitiveness in the marketplace and will increase the relative use of non-refillable drums.

The associations noted that drumMUSTER is just one initiative under the Industry Waste Reduction Agreement and the industry's achievements should be measured against the voluntary commitments made in the agreement, which is the real vehicle for delivering EPR, not the drumMUSTER program.

**Avcare** said it would support the NSW Government in achieving the timely implementation of the EPR principle through stewardship programs such as drumMUSTER. The partners to the national Industry Waste Reduction Agreement needed to review and revise the targets set in 1998, as these were based on overseas experience, mainly Canada. The targets do not reflect the situation in Australia, especially in relation to rates of return rates of containers. One reason why the program's return rate after four years is only 25%–30%, compared with 68% in Canada after 11 years, is that containers are not required to be triple-rinsed in Canada, whereas this is a non-negotiable requirement of the Australian program. Also, the average container size is 10 litres in Canada, compared with 20 litres in Australia.

Avcare said a recent survey by Baron Strategic Services indicated that Australian farmers were comfortable with the triple-rinsing requirement and saw this as integral to their product stewardship objectives. The survey also highlighted that farmers who do not use drumMUSTER (17%) do not necessarily send their drums to landfill but often retained them for other practical on-farm uses. The survey found that 27% of farmers claim to dispose of drums contrary to the objectives of the Industry Waste Reduction Agreement.

Avcare recommended government promotion of the drumMUSTER program at the local level where uptake is less than satisfactory and said the EPA should more actively promote

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<sup>22</sup> drumMUSTER advised in June 2003 (Vernon Keighley, Program Manager) that the basis for funding advertising and promotional costs had since been revised.

collection sites and dates. Avcare thought the EPA could do more to discourage farmers from burying drums, through regulatory or educational initiatives, and said this would strengthen responsible disposal. More direct promotion of the program at the local council level would also assist in increasing uptake and return rates of eligible containers.

The **Victorian Environment Protection Authority** said it would continue to work closely with other jurisdictions to maintain, evaluate and improve existing national product stewardship programs, such as that for agricultural/veterinary chemical containers.

### *Current action*

The drumMUSTER program provides for the collection, recycling or disposal of pesticide containers over one kilogram or litre in size manufactured by participants in the program. A levy of four cents per kilogram or litre is paid by consumers at the point of purchase for the collection, recycling or appropriate disposal of non-returnable containers. The program has received Australian Competition and Consumer Commission approval to extend its coverage to non-hazardous product containers and those with a capacity of less than one kilogram or litre.

drumMUSTER currently operates in 84 (97%) of the 87 NSW/ACT council areas identified as priorities because of the high sales of chemical drums in these areas (> 2000 per year). It operates in 122 (71%) of the 173 NSW/ACT local government areas.<sup>23</sup>

drumMUSTER data indicates that 4.65 million waste agricultural/veterinary chemical containers (7067 tonnes) were collected by the program between 1 February 1999 and 5 February 2004.<sup>24</sup> The largest numbers of container types collected were 2.69 million 20-litre plastic containers (3239 tonnes) and 1.41 million 20-litre steel containers (2539 tonnes).

An audit of drum sales in 2001 estimated that 4.235 million drums were sold nationally, including 1.232 million in NSW. In 2001, the rate of return of drums was 33% nationally and 28% in NSW<sup>25</sup> and 30% nationally in June 2002 (Avcare 2003, p.18). drumMUSTER estimates that levy reserves are sufficient to fund recovery rates of up to 50%.

Refillable containers accounted for 30% of the volume of chemicals sold in 2001,<sup>26</sup> but this level may decline because of the recent imposition of additional industry charges.

## Mobile phones and batteries

### *Why are mobile phones and batteries a waste of concern?*

Heavy metals in mobile phones and batteries, such as nickel, copper and cadmium, may have an adverse impact on the environment if disposed of to landfills or energy-from-waste facilities, and during reprocessing.

In Australia, 4–6 million mobile phones and batteries are disposed of or recycled each year, according to the Australian Mobile Telecommunications Association (AMTA). Some of the components in mobile phones and batteries are made from non-renewable resources. The rapid development of new models and technology has accelerated the number of obsolete mobile phones and AMTA estimates that Australia's 12 million mobile phone users replace their handsets every 18–24 months.

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<sup>23</sup> drumMUSTER statistics, 1 February 1999 – 5 February 2004, [www.drummuster.com.au](http://www.drummuster.com.au)

<sup>24</sup> drumMUSTER statistics, as above

<sup>25</sup> drumMUSTER collection statistics between 1 January and 31 December 2001

<sup>26</sup> Avcare presentation on drumMUSTER, provided in June 2003

## *Community views*

Submissions received on the Consultation Paper generally agreed with the nominated wastes of concern, with only seven commenting specifically on mobile phones and batteries.

One individual said mobile phones and batteries would cause problems for energy-from-waste facilities. He suggested restricting these facilities to those using discrete waste streams, such as sawmill waste, and that extensive emissions testing and community consultation should form part of the technology evaluation process.

**Sydney Water, Riverina Eastern Regional Organisation of Councils and Eurobodalla Shire Council** supported the AMTA initiative for the collection of mobile phones, batteries and accessories. **Eurobodalla Shire Council** said related products, such as mobile phones and NiCad batteries, should be integrated and industry encouraged to form partnerships for their collection and recycling. **Hornsby Shire Council** queried what proportion of the mobile phone levy is used to finance collection and advertisement of disposal options.

The **Local Government and Shires Associations** said the current voluntary scheme for taking back mobile phones and batteries is necessary given the rapid rate of obsolescence of these products. The scheme should be fully investigated and reviewed to determine return rates, the fate of returned products and the economics of the scheme. If the only achievement of the scheme is to centralise the disposal of phones and batteries, it is not necessarily meeting waste reduction outcomes.

The **Australian Council of Recyclers** supported EPR for products containing toxic and hazardous components that may place a burden on their end-of-life management, such as mobile phones.

## *Current action*

In 1999, the mobile phone industry established a voluntary program to recycle the potentially toxic components in mobile phones, batteries and accessories. A levy of 42 cents on each new phone handset and 13 cents for each battery pays for the recovery, recycling and safe disposal of unwanted phones and batteries. The industry scheme is managed by AMTA and had collected approximately 177 tonnes of mobile phones, accessories and batteries by June 2003, including around 250,000 handsets.<sup>27</sup>

AMTA did not make a formal submission on the Consultation Paper but provided background information on its scheme in informal talks with the EPA in March 2003. While the community appears to be generally supportive of the AMTA scheme, many stakeholders would like more information on its scope and achievements so that appropriate recovery targets can be set and audited. The EPA met with AMTA again in August 2003 to obtain additional information on the effectiveness of the AMTA scheme in relation to mobile phones and batteries and to commence dialogue on mechanisms for a transparent review of outcomes.

## **Packaging waste, including plastic bags**

### *Why is packaging waste a waste of concern?*

The total amount of packaging produced in Australia has not been quantified. However, 80,322 tonnes of polyethylene terephthalate (PET) was consumed in 2002; 32,500 tonnes of

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<sup>27</sup> AMTA, Mobile Phone Industry Recycling Program collections to June 2003

liquidpaperboard packaging (such as used in milk cartons) was manufactured in 2000–01; and over 592,200 tonnes of primary beverage container packaging was produced in 2002.<sup>28</sup>

Packaging waste, including metal, glass and plastic containers, paper and plastic bags, cardboard and polystyrene, comprises about one-third of the litter stream. There is strong community concern about packaging waste, especially plastic bags and polystyrene.

Good resource recovery opportunities exist for some materials such as high-density polyethylene (HDPE) and PET plastic, aluminium, paper and cardboard.

### *Community views*

Thirty-six submissions commented specifically on packaging waste:

- One submission said plastic packaging should not be a waste of concern.
- Five submissions agreed that packaging waste in general should be a priority focus, while another five believed specific packaging wastes streams, such as plastic bags (3), polystyrene (1) and containers (1), should have priority.
- Twelve submissions, mainly from local government and environment groups, supported the introduction of container deposit legislation (CDL) to deal with some packaging waste streams, while four industry submissions opposed CDL.
- Nine submissions commented specifically on plastic bags, mainly suggesting that they should be considered a packaging waste of concern. Since plastic bags were included in the category of packaging waste, this was the EPA's intention.

**Lake Macquarie City Council** said that packaging waste including plastic bags should have priority focus. **Cabonne Shire Council** also said packaging waste should have priority focus because it is high volume, highly visible, the subject of high community concern and frequently disposed of illegally.

**Eurobodalla Shire Council** felt the wastes of concern should include plastic bags and polystyrene. **Wollondilly Shire Council** said that plastic bags should have priority focus. **Port Stephens Shire Council** said it would support any scheme to reduce plastic bag litter. It would be interested in the outcomes of the evaluation of the National Packaging Covenant and supported CDL as the preferred EPR scheme for used container packages.

**Riverina Eastern Regional Organisation of Councils** questioned the NSW Government's commitment to EPR when it had not introduced CDL. The organisation claimed making it a national issue was delaying action. CDL would make the collection of beverage containers more viable and remove them from the waste stream. The organisation urged the Government to introduce CDL in NSW. Its members strongly supported the National Packaging Covenant and believed that EPR schemes should subsidise recycling in communities where it is not economically sustainable.

**Southern Sydney Regional Organisation of Councils** said packaging wastes should include plastic bags, which are ubiquitous and problematic in material recovery facilities, and polystyrene packaging products, which are confused with recyclables and contaminate kerbside collections. The latter could be replaced with corn starch products. Packaging should be an area for priority focus. The voluntary National Packaging Covenant was neither appropriate nor equitable. Local councils bore the major burden for packaging waste and it was not acceptable that kerbside collection had become the default mechanism for managing

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<sup>28</sup> Information sourced from action plans supplied under the National Packaging Covenant by the Plastics and Chemicals Industries Association, the Association of Liquidpaperboard Carton Manufacturers Inc. and the Beverage Industry Environment Council, respectively. Action plans can be downloaded from the Packaging Council of Australia website at [www.packcoun.com.au/ActionPlans/Govt/ap\\_Govt\\_NSW\\_Y1P.doc](http://www.packcoun.com.au/ActionPlans/Govt/ap_Govt_NSW_Y1P.doc)

it. CDL could complement kerbside recycling and would change the cost structure, which currently penalises older people who run smaller households. Producers and consumers of packaging needed to contribute to cost recovery.

**Northern Inland Regional Waste** agreed with the wastes for priority focus and noted that packaging waste is one of its priorities.

**Lismore City Council** advised that it did not consider the National Packaging Covenant was an effective post-consumer management scheme that fulfils the industry's obligations towards EPR. The council queried whether containers collected by local authorities are actually recycled. It believed only plastics numbered 1 (PET) and 2 (HDPE)<sup>29</sup> are genuinely recycled and the rest landfilled. Lismore Council was concerned that action plans under the National Packaging Covenant did not include measures to increase the use of recyclate in production processes. If the amount of packaging collected by councils was genuinely recycled, society might benefit through reduced resource consumption but would need to recognise the costs, which are greater in regional areas. The council said the review of the National Packaging Covenant should include an appraisal of the true state of recycling in NSW.

The **North East Waste Forum** agreed that packaging should have priority focus and questioned whether there was a post-consumer management scheme in place for this waste. The group claimed that the material collected is not necessarily recycled and called on NSW to report on the true state of recycling.<sup>30</sup>

**Gosford City and Wyong Shire Councils** said polystyrene should be considered separately from packaging waste as there is no post-consumer management scheme in place for polystyrene.<sup>31</sup> Identifying packaging waste as a waste of concern could lead to under-packaging, resulting in package failure and damage to goods. The packaging industry would need to find the right balance when redesigning goods.

**Sutherland Shire Council** believed that polystyrene should be identified as an area for priority focus. **Campbelltown City Council** said that polystyrene should be identified as a waste of concern because it is wrongly assumed to be recyclable, which leads to contamination of recycling bins. Polystyrene is often bulky and does not degrade easily. The council also felt there should be compulsory levies or new taxes on products that enter the waste stream in high volumes, such as plastic bags and drink containers.

The **Local Government and Shires Associations** considered that the National Packaging Covenant and the National Environment Protection Measure were not achieving worthwhile outcomes in terms of better life-cycle management of packaging. While the Covenant was based on the principle of shared responsibility but industry did not meet the true costs of the life cycle of its products, it would remain unacceptable to local government. Packaging waste was a major concern because of its prevalence in the litter stream and the costs of collecting materials that have little economic value. Although a number of products claim to be recyclable, the facilities do not exist to recycle them; an example is foil-lined liquidpaperboard drink containers. Local government supported advance disposal fees and CDL for beverage containers and other forms of packaging as they are more targeted and equitable than the current arrangement under which recycling is heavily subsidised by councils and the community at large. Councils have highlighted the problems posed by

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<sup>29</sup> PET and HDPE are numbered 1 and 2 under the Plastics Coding System, which identifies the type of resin a plastic container is made from. In July 2003, Australian Vinyls Corporation and Visy Recycling announced a new program for the recovery of PVC bottles (Code 3), which can be delivered in full or part loads to their required specifications.

<sup>30</sup> The available data on this issue is provided in the Fact Sheet on Packaging in Appendix II. This suggests that 94% of the 492,000 tonnes of packaging collected at kerbside in NSW was recycled or sold for secondary use in 2001–02.

<sup>31</sup> The National Packaging Covenant applies to all packaging waste in the domestic waste stream, including polystyrene.

polystyrene packaging. EPR schemes for products should address the packaging they are delivered in, especially for electrical products and whitegoods.

**Clean-Up Australia** noted the impact of packaging waste on the litter stream. The top 10 items collected in the 2002 Clean-Up Australia Day included: cigarette butts (29%); plastic chip and lolly bags (13%), glass alcoholic beverage bottles (10%), glass pieces (9%), plastic bottle caps (8%), paper pieces (7%), metal/aluminium foil confectionary wrappers (6%), plastic drink bottles (6%), soft drink cans (6%) and metal/aluminium bottle caps (6%). There is substantial consumer confusion about what packaging can be recycled and no facilities to handle major litter streams, such as fast food packaging, and chip and lolly packets. There is debate about the effectiveness of current recovery and recycling options for plastic bags.

Clean-Up Australia suggested that the Expert Reference Group should be responsible for:

- consumer education on which packaging can be recycled
- incentives, such as CDL or other economic instruments, to recover packaging in public places
- NSW Government investment or incentives to promote plastics recycling or require packaging that can be easily reused, recycled or composted.

The **Nature Conservation Council** said containers should be given priority focus because there was no post-consumer management scheme in place for these.

The **Manly Greens** felt that packaging waste for the food and beverage industry should have priority focus and that monitoring the National Packaging Covenant was not sufficient. The conditions for a mandatory scheme are largely fulfilled for packaging waste. They believed the White report on CDL (White 2001) made a compelling case for its introduction and that it would reduce litter. They said South Australia has been successfully operating a CDL scheme for a decade and there were no constitutional bars to NSW acting unilaterally. The Manly Greens said there was a strong case for the introduction of CDL concurrent with the voluntary scheme. Kerbside programs still have a long way to go in recovering packaging materials.

**Hunter Residents Against Sydney Garbage Dumps** said CDL should be introduced immediately in NSW, rather than waiting for Commonwealth action. In its view, self-regulation of the packaging industry through the National Packaging Covenant had failed.

The **Waste Crisis Network** supported a deposit system for cans, bottles and cartons, which applies in South Australia, and a levy on plastic bags.

The **Total Environment Centre** (TEC) identified packaging waste as a waste of concern in that it creates serious difficulties for waste management. This should include bulk packaging materials, such as disposable pallets and other materials used in warehousing and distribution, in addition to the packaging waste covered by the Covenant. However, in the TEC's view, packaging waste should not have priority focus as it falls within a group of wastes that are already subject to some form of voluntary initiative or do not present an immediate or direct threat to human health or safety.

Two individuals supported the introduction of CDL to deal with packaging waste. One also said that taxation should be used to discourage complex packaging and there should be a levy on plastic bags to reduce litter.

**PlanningNSW**<sup>32</sup> said plastic bags should be considered a waste of concern because there is high community disquiet about them.

The **National Parks and Wildlife Service** said packaging waste, especially cans and glass bottles, was frequently dumped on its land, which reduced amenity and attracted further

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<sup>32</sup> Now part of the Department of Infrastructure, Planning and Natural Resources

rubbish. Removal is costly and time-consuming and there can be impacts on scavenging wildlife.

**Sydney Water** said that there would be benefits if EPR was applied to materials entering its sewage treatment facilities from stormwater and wastewater systems, such as plastic bags and packaging. Sydney Water is working with its suppliers to reduce the amount of packaging waste from computing equipment.

The **Australian Council of Recyclers** supported product stewardship for benign products where responsibility needs to be shared across the supply chain, such as used packaging. The council felt the National Packaging Covenant was a successful voluntary initiative.

**Metalcorp Recyclers** said EPR would not bring about significant environmental improvements for products like paper, glass, plastics, etc. that can be readily recycled. These are appropriate for shared responsibility schemes.

**Waste Service NSW** believed there was a limited market for processing some wastes, such as glass beverage containers and jars, and realistic charges would need to be imposed for their management. Resource NSW had a role to play in developing markets for these. Waste Service NSW said the wastes of concern should include plastic shopping bags, glass beverage containers and jars, among others. They believed, however, that packaging should be excluded from priority focus as established kerbside recycling exists, supported by the National Packaging Covenant.

The **Plastics and Chemicals Industries Association** did not think that plastic packaging waste met the criteria for a waste of concern given the considerable efforts under way with the National Packaging Covenant. Packaging extends the shelf-life of products and reduces waste. PET and HDPE plastic have existing collection infrastructure with low levels of cross-contamination and robust markets to take up recyclate. The recycling rate for PET is 32% and 50% for HDPE plastic.

The association's annual Plastics Recycling Survey will provide a national data reference set. It felt the EPA was sending a message that PET and HDPE would be targeted for regulation. The National Packaging Covenant covers the whole supply chain and has resulted in a range of initiatives by over 600 signatories to increase the use of recyclable/recycled packaging and lightweight packaging. There has been a range of programs specifically to reduce litter, of which beverage containers account for only 13%. There is a need for further research on the effectiveness of the Covenant, which should continue with EPA support. The association would like to work with the EPA and Resource NSW on market development.

**Visy Recycling** operates six paper recycling machines in Australia and two in the United States, which together produce over 1.2 million tonnes of recycled paper which is used in packaging annually. Visy currently collects, among other products, over 900,000 tonnes of paper and cardboard nationally each year, which is recycled into packaging paper. The company does not regard packaging as a waste but as a resource to be recovered and reused. The Priority Statement proposal to monitor packaging waste over the next 12 months may require further segmentation as some materials have good recycling and recovery rates. For example, the recovery rate for aluminium cans is 70% and over 60% for paper packaging, especially boxes. Developments in packaging are constant and more mixed materials are being used with superior life-cycle performance.

Visy regarded kerbside recycling as the most efficient means to recover and recycle used materials and the potential existed to enhance recovery through more consistent collection systems. Visy considered the South Australian CDL scheme to be the only real EPR scheme in Australia. Unscrupulous operators transport waste to South Australia to collect deposits not paid in that State which distorts waste management and leads to higher recovery rates there.

The **Australian Industry Group** (AIG) was confident that the forthcoming review of the National Packaging Covenant would provide strong support for the continuation of this

successful scheme. AIG would totally oppose any move by NSW to withdraw from the Covenant in favour of State-based approaches, such as CDL.

The **Australian Food and Grocery Council** said focusing on the waste performance of packaging ignored life-cycle impacts. Packaging may represent only a small component of an industry's ecological footprint and deliver environmental benefits by preserving the useful life of goods. For example, 305 litres of water are required to make a litre of milk and the packaging prevents milk spoilage. These benefits should be considered. Few companies can modify their packaging significantly without compromising other roles.

The council questioned the effectiveness of some EPR tools, such as eco-labelling and CDL. Many non-recyclable forms of packaging significantly extend product life. None of the current labelling schemes offers consumers information that would enable them to make improved decisions about the use and disposal of products. The council opposed CDL because it can only be applied to about 3% of the waste stream; it adds considerably to household costs compared with kerbside recycling; and it requires substantial collection infrastructure. Higher overall operating costs are transferred to industry that would be passed on to consumers.

The **Paper Recycling Action Group of Australia** said it was not clear how an EPR scheme for packaging in NSW could be coordinated with the National Packaging Covenant, which was in force till July 2004. The action group also felt the South Australian CDL scheme was the only genuine EPR scheme operating in Australia. The attractive nature of the deposit scheme encourages unscrupulous behaviour by some operators who import used containers into the State to collect the deposits. Recovery rates are therefore higher than normal. The group is interested in packaging waste and office paper, which have been the subject of significant industry attention and have extensive infrastructure and take-back systems in NSW.

The **Vinyl Council of Australia** noted that polyvinyl chloride (PVC) accounted for only 3% of packaging waste. Additional comments are outlined in 'Community views' in the PVC section.

The **West Australian Department of the Environment, Water and Catchment Protection** is moving towards zero waste by 2020, focusing on wastes as a resource and EPR as a tool to facilitate redesign, repackaging and appropriate pricing of products to reduce consumption.

The **Victorian Environment Protection Authority** will work closely with other jurisdictions to maintain, evaluate and improve national product stewardship schemes, such as that for packaging waste.

### *Current action*

#### **National Packaging Covenant**

Levels of packaging waste are addressed through the National Packaging Covenant, a co-regulatory agreement between industry and government, which aims to improve recovery, reuse and recycling of used domestic packaging materials. The Covenant commenced in August 1999 and expires in July 2004. It is managed by the Covenant Council, which has representatives from Commonwealth, state/territory and some local governments, and industry.

The DEC represents the NSW Government on the Covenant Council and is a member of the NSW Jurisdictional Recycling Group under the Covenant. The DEC is implementing an Action Plan, which sets out how the NSW Government will meet its commitments under the Covenant. The latest Action Plan runs from July 2003 to June 2004 (Packaging Council of Australia 2003). Priority areas include supporting local councils to move towards improved



kerbside recycling contracts and systems; increasing markets for both currently collected and emerging materials; and providing sound data to guide continued program development.<sup>33</sup>

Businesses who do not join the Covenant are regulated by the states under the National Environment Protection Measure (NEPM) for Used Packaging Materials. In NSW, the Used Packaging Materials Industry Waste Reduction Plan is used to enforce the NEPM. It applies to all brand owners with head offices in NSW that are not Covenant signatories and whose packaging forms part of the domestic waste stream. Companies with less than 1% market share in NSW and who sell their products only within NSW are exempt from compliance with the NEPM.

At 30 June 2003, there were 617 signatories to the Covenant, including 256 from NSW. Most in NSW are in the food/grocery, health and beauty, packaging, manufacturing, hardware, pharmaceutical/chemical and beverage sectors. In the supply chain, they are generally product manufacturers and distributors/retailers.

In 2002–03, 51 new companies in NSW signed the Covenant, largely as a result of the EPA's advisory and compliance program, which encourages brand owners to participate in the agreement. The EPA wrote to 425 companies about their obligations under the Industry Waste Reduction Plan. This led to 128 statutory notices being sent to companies, requiring them to provide information on their status as brand owners. Those that choose not to join the Covenant are subject to the mandatory provisions of the NEPM/IWRP, which requires detailed reporting on the type and quantity of packaging and specifies mandatory recovery rates. This prevents these companies from gaining a commercial advantage over Covenant signatories.

With the Covenant due to expire in July 2004, a comprehensive evaluation of its effectiveness and that of the NEPM is under way, with input from industry, the Commonwealth, state and local governments, and environment groups. The DEC is on the steering committee for the major independent review being undertaken on behalf of the Covenant Council.

In its contribution to the review, the DEC drew attention to the need to ensure that priority packaging types, in terms of their environmental impact, were being adequately addressed. Stakeholders have suggested that these include polystyrene, polystyrene foam, polypropylene, PVC, stretch film, oil containers and products containing mixed plastics. NSW is keen to ensure that administrative and compliance processes are simple, effective and deliver real environmental outcomes and benefits.

The DEC has also funded the Nature Conservation Council to provide the perspective of an environment group on how the Covenant has worked in NSW.

The final report of a review of the Covenant by consultants Nolan-ITU was released in February 2004. It recommended retaining the Covenant with its regulatory safety net for a minimum of three years; improving operational elements of the Covenant/NEPM; and developing nationally consistent and measurable outcomes on the environmental impact of consumer packaging (Nolan-ITU Pty Ltd 2004).

An independent local government evaluation of the Covenant is also being prepared. The full review of the Covenant should be completed by March 2004 and key recommendations submitted to Ministers for consideration at the Environment Protection and Heritage Council (EPHC) meeting in April.

### **Container deposit legislation**

In February 2002, the NSW Government released the independent report on CDL undertaken by Dr Stuart White from the University of Technology, Sydney (White 2001). The review recommended that policy and legislative frameworks in NSW incorporate EPR principles and governments seek national agreement to explore a mandatory EPR scheme which could

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<sup>33</sup> For more information visit [www.jrqnsw.com.au/reports.html](http://www.jrqnsw.com.au/reports.html)

include CDL legislation. In May 2002, the Government referred the report to the EPHC, which subsequently requested the national Waste Working Group to examine the issue.

As a consequence, other jurisdictions have been looking into CDL. The Australian Capital Territory Government commissioned the Centre for Environmental Solutions to conduct an independent assessment of the issues associated with implementing CDL in the ACT. The report, *Impacts of Implementing Container Deposit Legislation in the ACT*, released in August 2002, concluded that current recycling programs were more comprehensive and cost-effective than CDL, and that it would be easier to educate residents under the current system than under a combined kerbside/CDL system (Centre for Environmental Solutions 2002). The report suggested that an advance disposal levy could assist in funding additional waste management and recycling activities in the ACT but noted that a levy would require national support.

To get an understanding of what impact a CDL system might have in Victoria, that State's EPA commissioned Nolan-ITU to study the financial impacts of a scheme on three Victorian communities: an urban area, a large regional centre and a smaller rural centre. The study was then peer-reviewed by consultants Perchards UK and subsequently published by the EPA Victoria (2003).

Both the Nolan-ITU and the Perchards UK review challenged some assumptions of the earlier White report, including a 92% return of containers through a CDL system and the valuation of retail space at the point of retail collection. Changing the assumptions affects White's economic modelling and results in significant differences in the assessment of the viability and costs of CDL. The Victorian EPA believes that the introduction of CDL in that State in parallel with kerbside recycling would lead to a substantial cost increase for the local community.

In May 2003, the Waste Working Group reported these findings to the EPHC which had earlier agreed that the National Packaging Covenant and the National Environment Protection Measure for Used Packaging Materials would be the national instruments for managing consumer packaging for the life of the Covenant. Ministers noted the divergent views associated with the expansion of CDL in Australia and resolved to consider the outcomes of the review of the National Packaging Covenant before further addressing the wider introduction of CDL in Australia.

### **Plastic bags**

The EPHC has extensively considered the issue of plastic bags. In December 2002, it challenged retailers and the broader community to work together to meet 50% recycling and reduction rates and cut plastic bag litter by 75% by the end of 2004. More than 6.9 billion plastic shopping bags are used annually in Australia.

In May 2003, Environment Ministers expressed their disappointment that the draft national code of practice developed by retailers had failed to meet the targets set in December 2002. Ministers agreed to pursue nationally coordinated mandatory measures at their next meeting (EPHC 2003).

The EPHC agreed in August 2003 to the phasing out, within five years, of lightweight single-use carry bags made of high-density polyethylene (HDPE). In October, the EPHC accepted the Code of Practice for the Management of Plastic Bags, developed by the Australian Retailers' Association (ARA), which includes commitments to:

- reduce the number of lightweight bags used by 25% by the end of 2004 and by 50% by the end of 2005
- increase the recycling of lightweight bags by between 15 and 30%
- introduce recycled-content plastic bags consistent with their availability
- undertake a range of education initiatives.

Retailers are also supporting the community goal of cutting litter from plastic bags by 75% by 2005. They have agreed to:

- introduce a transparent and independent auditing process to measure bag use, recycling and litter levels
- report regularly to the EPHC on progress
- undertake a vigorous recruitment program to encourage more retailers to join the scheme.

## Cigarette butts

### *Why are cigarette butts a waste of concern?*

Approximately 32 billion cigarette butts are generated each year in Australia.<sup>34</sup> Cigarette butts comprised 58% of all items littered in public places around Australia (Beverage Industry Environment Council & Community Change 2001) and butts have consistently topped the list of items picked up in Clean-Up Australia Day rubbish since it started in 1990. A total of 48% of people surveyed by the EPA in 2003 in an evaluation of its litter reduction campaigns rated cigarettes as the litter item of greatest concern, up from 35% in 2000.

Cigarette filters contain cellulose acetate and under normal environmental conditions last for about 18 months, although they can remain in the environment for five years. Wind and rain can carry cigarette butts into waterways, where toxic chemicals leach out within an hour of contact with the water and persist for at least seven days, threatening water quality and many life forms. Preliminary assessment indicates that butts pose a moderate hazard to aquatic organisms. Cigarette butts have been found in the stomachs of birds, turtles, whales and fish, affecting their digestion and potentially leading to poisoning or starvation (Clean-Up Australia 2004a).

Discarded cigarette butts have also been identified as a cause of bushfires around the State.<sup>35</sup> In pre-litter campaign qualitative research with focus groups in 2003, the EPA found that respondents – even smokers – regarded cigarette butts as a danger for animals and a bushfire risk.

Currently, the cost of managing the environmental impacts of cigarette butts falls mainly on ratepayers, rather than tobacco companies and smokers.

### *Community views*

Submissions received on the Consultation Paper generally agreed with the nominated wastes of concern, with 10 submissions specifically commenting on cigarette butts.

One submission suggested they should have priority focus.

**Clean-Up Australia** noted that cigarette butts were the most commonly collected items in its 2002 Rubbish Day Report, comprising 29% of the total.

One individual said that the category of cigarette butts should include cigarette packaging as it is highly visible and slow to disintegrate.

**Sydney Catchment Authority** suggested that, given the high proportion of litter caused by cigarette butts, the EPA should consider giving them priority focus.

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<sup>34</sup> Details at [www.environment.nsw.gov.au/litter/factsaboutlitter.htm](http://www.environment.nsw.gov.au/litter/factsaboutlitter.htm)

<sup>35</sup> *NSW Fire Brigades Annual Report 1995* estimated that cigarettes and matches directly caused over half of all fires in the built environment, with as many as 1200 grass and bushfires each year attributed to cigarettes.

The **Local Government and Shires Associations** said that cigarette butts were a major issue and EPR action was urgently required. The associations said the recently established Butt Littering Trust (see 'Current action' below) did not go far enough and that councils and other stakeholders should be fully reimbursed by cigarette companies for programs to address cigarette butt litter, including the provision of infrastructure and education.

The **Australian Council of Recyclers** questioned the inclusion of cigarette butts in the wastes of concern on the basis of their volume and toxicity.

The **Total Environment Centre** identified cigarette butts as a waste of concern because they create serious difficulties for waste management. However, in its view cigarette butts should not have priority focus as they fall within a group of wastes that are already subject to some form of voluntary initiative or do not present an immediate or direct threat to human health or safety.

The **Waste Crisis Network** said that wastes that are visually unappealing should not be given priority over hazardous wastes and felt, on this basis, that cigarette butts should have low priority.

**Port Stephens Shire Council** believed there would be difficulties applying EPR to cigarette butts.

The **Beverage Industry Environment Council** said that, while cigarette butts did not meet some of the criteria for wastes of concern, such as potential for beneficial resource recovery, other criteria – detrimental environmental impacts, likelihood of illegal disposal through littering and level of community concern about the waste – could be addressed by the industry funding programs to encourage behavioural change that reduced littering.

The **Victorian Environment Protection Authority** said it would continue to work with all jurisdictions to give priority to a number of wastes, including cigarette butts.

### *Current action*

All levels of government have funded extensive litter education and enforcement campaigns. In NSW, individuals can face on-the-spot fines of \$60 for dropping a cigarette butt, \$200 for throwing a cigarette butt out of a car and \$375 for aggravated littering, such as discarding a lit butt on a No Burn Day. The maximum penalty for aggravated littering is \$3300 for an individual and \$5500 for a corporation.

In 2002–03, a total of 6200 community complaints for littering from vehicles (an average of 517 per month) were followed up by the EPA. Eighty percent of the 5784 penalty notices for littering from vehicles issued by police and officers from the EPA, Roads and Traffic Authority, Resource NSW, National Parks and Wildlife Service, Sydney Catchment Authority and local councils were for cigarette butts; 160 of these were for aggravated littering.

In response to community concern in early 2003 about bushfires allegedly being started by discarded cigarette butts, the EPA maximised its enforcement of littering from vehicles, particularly cigarette butts, and encouraged local councils to undertake similar blitzes. Community members were encouraged to contact Crime Stoppers in situations where they had seen littering with a lit cigarette that resulted in a fire or where a fire later started in the area. Specific warning letters were sent to cigarette butt litterers, advising of potential 14-year gaol terms and fines of over \$100,000 for bushfire offences under the *Rural Fires Act 1997* and the *Crimes Act 1900*.

Government has also funded extensive stormwater education programs to prevent cigarette butts and other litter from entering waterways. Local councils are responsible for cleaning up cigarette butt litter from streets and operating public litter bins.

In 2002, the Environment Protection and Heritage Council (EPHC) recognised cigarette butt litter as a waste of concern and wrote to major Australian tobacco companies to encourage

them to consider voluntary initiatives to reduce its environmental impacts. Three firms responded, indicating a willingness to work cooperatively with government to address cigarette butt litter, through initiatives such as Keep Australia Beautiful and the Beverage Industry Environment Council's *Do the right thing/Don't waste Australia* campaigns. As signatories of the National Packaging Covenant, companies are also developing and reporting on actions to address the environmental impacts of cigarette packaging.

British American Tobacco Australia has established an independent Butt Littering Trust (BATA 2002) with funds of up to \$1 million in the first two years for actions to reduce the impact of cigarette butt litter. The trust has completed and published a report on the current state of anti-butt littering actions and policies in Australia, as well as developed and distributed to every local council in Australia a questionnaire on current initiatives, expenditure and butt littering issues. It has also called for expressions of interest to undertake projects using trust money, with initial priority areas being butt littering behaviour in the CBD, in cars and other vehicles, and in iconic settings, such as national parks.

The EPHC is monitoring the activities of cigarette companies to support voluntary and government-initiatives to address cigarette butt litter across Australia.

## Electrical products, excluding computers, televisions and mobile phones

### *Why are electrical products a waste of concern?*

Every year a significant and increasing number of electrical products are discarded. Australian households are estimated to be using a total of 45.5 million major electrical appliances, including air-conditioners, hot water heaters, stoves, washing machines, dishwashers, freezers, refrigerators and clothes dryers, with 2.4 million of them disposed of annually (Environment Australia 2001b, Table 1). This number of products translates directly into millions of tonnes of metals, plastics, glass, composites and various other materials. It is estimated that there are 31,400 tonnes of waste from small appliances alone.<sup>36</sup>

The manufacture, use and disposal of electrical equipment emits approximately 48 million tonnes of greenhouse gases, which is a significant component of Australia's overall emissions (DEH 2003a).

In addition, most small electrical products are made from non-renewable materials with low levels of recycled or recyclable content. The complex nature of these products makes material recovery difficult. The ready availability of electrical products and their subsequent disposal is likely to continue to increase because of low product prices, rapid obsolescence and the increasing range of applications.

Lighting equipment, such as fluorescent lamps, incandescent bulbs and low sodium lamps, is of concern because of its ubiquitous nature. It is estimated that Australia's lighting stock is 170 million units, with 71 million fluorescent lights in service in the commercial sector alone (Environment Australia, AEEMA & CESA 2001). Lighting equipment may contain toxic substances, such as mercury, polychlorinated biphenyls (PCBs) and phosphors, which have the potential to contaminate municipal waste streams.

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<sup>36</sup> Small appliances include radios, hi-fi equipment, vacuum cleaners, power tools, kettles, toasters, hairdryers, lighting, etc.

### *Community views*

Fifteen submissions commented on electrical products, other than computers, televisions and mobile phones.

One individual said the category of electrical equipment should include whitegoods residuals.

**Hunter Residents Against Sydney Garbage Dumps** believed NSW lagged behind international developments and should adopt world best practice, such as banning electrical products from landfill.

The **Waste Crisis Network** said small electrical products should be returned to supermarkets or charities for reuse or recycling.

The **Total Environment Centre** identified whitegoods as a waste of concern because it created serious difficulties for waste management.

**Wollondilly Shire Council** supported priority focus for all electrical goods, including fluorescent tubes and light bulbs.

**Maitland City Council** said the wastes for priority focus were consistent with its priorities, which included electrical equipment.

**Manly Council** and the **North Sydney Waste Management Professional Officers Group** said there was limited data on the dumping of whitegoods.

**Marrickville Council** reported that whitegoods made up a significant component of its household clean-ups and noted that, in the United Kingdom, some whitegoods were subject to redeemable deposits. Fisher & Paykel is running a whitegoods recycling trial at Long Bay gaol but the transport costs are too high for the council to participate.<sup>37</sup>

**Southern Sydney Regional Organisation of Councils** said EPR should be closely linked to the outcome areas of *NSW Waste Avoidance and Resource Recovery Strategy 2003*, especially a reduction in toxicity. The continued channelling of heavy metals from electrical products, such as light bulbs, fluorescent tubes, cathode ray tubes and circuit boards, into landfill must be eliminated and replaced by a system of recovery for reuse or substitution of safer materials.

The **Local Government and Shires Associations** supported EPR for electrical products and their packaging to improve the reusability of non-electrical components, such as panels and packaging, and promote repair of equipment at reasonable cost, as the cost of components often exceeds the cost of new products.

The **Australian Council of Recyclers** supported EPR for products containing toxic and hazardous components, including whitegoods.

The views of the **Australian Electrical and Electronic Manufacturers' Association** and the **Consumer Electronics Suppliers Association** in relation to priorities for electrical equipment are outlined in 'Community views' in the Television section.

Comments by the **Office of Fair Trading** in relation to standards for electrical goods appear in 'Community views' in Computers.

The **Victorian Environment Protection Authority** said it would continue to work with all jurisdictions to give priority to managing electrical products, among other priority wastes.

### *Current action*

See comments in relation to computers and televisions.

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<sup>37</sup> Fisher & Paykel has advised that this trial ceased in 2003.

## End-of-life vehicle residuals

### *Why are these products a waste of concern?*

The process of metal shredding follows the recovery and recycling of car parts from 'end-of-life' vehicles. The Australian Bureau of Statistics estimates that 0.5 million vehicles reach the end of their operational life each year (ABS 1999), but this figure is disputed by metal recyclers who, based on their throughput, believe that only 300,000 vehicles are scrapped annually.

A competitive market exists for recycled auto parts and the metal content of vehicles, which is about 70% of the weight of the vehicle. Residuals from metal shredding include rubber, glass, plastic, lead, other heavy metals, oils, automotive fluids, etc. This is generally landfilled. Around 100,000 tonnes of shredder residuals are generated in NSW each year, with about 65% originating from vehicles (ACOR 2003, p.2). Recyclers in NSW are keen to see action on better end-of-life management, by designing cars for disassembly, removing hazardous components and labelling plastics.

### *Community views*

Submissions received on the Consultation Paper generally agreed with the nominated wastes of concern. Only 10 specifically commented on end-of-life vehicle residuals, including one submission arguing that end-of-life vehicles should be a priority.

**Marrickville Council** said that abandoned vehicles were a huge administrative and waste burden for it and the financial return on metal recycling was poor. The council proposed the imposition of a \$500 end-of-life tax at the time of vehicle purchase.

The **Local Government and Shires Associations** had no specific comment on this product, but said they would support any EPR scheme which improved the reusability and recyclability of vehicle components.

The **Beverage Industry Environment Council** noted that end-of-life vehicle residuals were not listed as a priority area of focus despite their potential toxicity.

**McCoy Global Resources** advised that it proposed to build a recycling plant in the Hunter region targeting car shredder residue among other wastes.

Another recycler, **Metalcorp**, targeting a variety of wastes including end-of-life vehicles, said that EPR would encourage 'design for the environment' and 'design for recycling'. Every tonne of residuals is the result of ten times this weight being diverted from the waste stream. Metalcorp considered that vehicle residuals should become the responsibility of the producer. They can be expensive to dispose of and advance disposal fees would improve recovery rates and ensure hazardous material was properly managed. EPR would work best where there is clear ownership of products, through branding or serial numbers. Whereas some products, like paper, glass and plastic, were appropriate for shared responsibility, the company believed that EPR was appropriate for complex products that may require pre-treatment to reduce the hazard of residuals. EPR would attack the growing cost of recycling by:

- shifting disposal responsibility and costs onto waste generators
- improving recovery rates and producing cheaper alternatives to virgin materials
- reducing environmental problems associated with contaminants entering the recovered materials stream.

According to the **Australian Industry Group** (AIG), EPR for waste tyres could have an adverse impact on the economics of end-of-life vehicle recycling, but it did not say how. AIG noted that the disposal of shredder residuals is becoming expensive and the issue of the

responsibility for it needs to be addressed in a manner that does not result in the discouragement of recycling or the concealment of contaminants in waste.

**Insurance Australia Group** has a strong interest in smash repair and end-of-life vehicles and is implementing a range of initiatives for better environmental outcomes. Some key areas for green motor action include: improving vehicle design, road and driver safety, waste management, smash repair and consumer information, greater reuse of car parts (only 5% in NSW), and regulatory support through EPR schemes. The company has an Industry Partnership Program grant to investigate the environmental benefits of reusing parts. The company said EPR for end-of-life vehicles should be a priority area given the potential to achieve significant reductions in consumption of non-renewable materials, greenhouse gases and waste to landfill.

The **Total Environment Centre** identified end-of life vehicles as a waste of concern because they create serious difficulties for waste management that may require a national scheme.

The **Plastics and Chemicals Industries Association** would like to work with the EPA and other stakeholders to improve the management of residuals from vehicles.

The **Victorian Environment Protection Authority** said it would continue to work with all jurisdictions to give priority to a number of wastes, including end-of-life vehicles.

### *Current action*

The Environment Protection and Heritage Council initiated a national survey of management practices for shredder floc<sup>38</sup> waste in late 2002. The survey found that shredder floc was a major waste stream being disposed of to landfill in a number of jurisdictions and there was a need for further analysis of the contaminants it contained.

Shredder floc is regulated differently in each jurisdiction. It has been agreed at working group level that a national approach to its management would be beneficial and assist in the continued viability of the scrap metal industry. Jurisdictions are also considering the development of consistent standards for sampling and analysis of shredder floc and managing shredder floc wastes. Consideration could be given to the development of consistent national standards for vehicle disassembly and product stewardship programs with the vehicle and whitegoods industries. Further work is required to assess the practicability of the options and approaches identified.

## Household hazardous waste

### *Why is household hazardous waste a waste of concern?*

The EPA's Consultation Paper defined 'household hazardous waste' (HHW) to include paints, domestic pesticide and automotive chemical wastes, pharmaceuticals, smoke alarms,<sup>39</sup> and batteries (other than NiCads) containing lead and other heavy metals. *NSW Waste Avoidance and Resource Recovery Strategy 2003* defined HHW to include paint, oil, batteries, smoke detectors and medical wastes. (Resource NSW 2003a, p.47) While some of these wastes would be considered hazardous if they were generated outside households, this category includes chemical wastes, such as water-based paints, which are not hazardous but

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<sup>38</sup> 'Shredder floc' is a by-product of the metal shredding process, consisting mainly of non-metallic material. Its composition depends on the feedstock and is highly variable.

<sup>39</sup> The amount of radioactivity contained in domestic smoke detectors is not high enough to trigger the regulatory requirements of the *Radiation Control Act 1990*. In 2001 the Radiation Health Committee, an advisory body to the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA), resolved that domestic smoke detectors could be disposed of in normal domestic waste. ARPANSA is arranging with Standards Australia to have misleading disposal instructions removed from labelling requirements.



may still cause problems for materials recovery and pose risks to the environment and human health if inappropriately disposed of, as discussed below. As a result, this waste of concern has been renamed 'Household hazardous and chemical wastes' in *EPR Priority Statement 2004*.

Disposal of these materials into the municipal waste stream or sewerage systems can adversely affect occupational and public health and safety, and the operation of sewage treatment plants and/or biota downstream from sewage treatment plants. A particular concern is the ability of these wastes to cause problems for more innovative thermal and biological municipal waste treatment technologies. They may contaminate and limit the recovery of resources from these processes by, for example, contaminating compost with heavy metals.

An estimated 8800 tonnes of household hazardous and chemical wastes are generated in metropolitan Sydney each year. Around 50% of this waste is collected and diverted from the waste stream or sewer systems.<sup>40</sup>

Some household hazardous and chemical waste streams have good resource recovery potential. A major challenge in strengthening appropriate producer responsibility for these wastes will be the diversity of industries where they originate.

### *Community views*

Eighteen submissions commented specifically on HHW as defined in the EPA Consultation Paper. Five submissions suggested that these wastes (or some specific streams, such as automotive chemicals, batteries, gas bottles, lubricants and oils, paints, pesticides and solvents) should have priority focus over the next 12 months. One submission said HHW should not be identified as a waste of concern.

Ten submissions requested that community sharps<sup>41</sup> receive consideration and seven nominated biomedical waste as a waste of concern. One of these submissions proposed that community sharps have priority focus and one that medical wastes and pharmaceuticals should be a priority.

**Hunter Water Corporation** believed that HHW should be given priority focus over the next 12 months. The corporation, together with Sydney Water and several councils, conducts free collections of household chemicals that pose a threat to sewage systems or waterways. The collections also bring public health benefits. Preliminary estimates suggest that there may be 130,000 tonnes of HHW in the community. Hunter Water Corporation felt that NSW manufacturers of paints, domestic pesticides and automotive chemicals were not taking responsibility for the safe disposal of these products and the cost was borne by the State and local governments. Industry needed to provide a recycling/reuse option or fund appropriate waste collection and disposal.

**Sydney Water** said the main wastes of concern for sewage quality and biosolids were organophosphate pesticides because buyers were not provided with correct disposal information at their point of sale. Sydney Water's household chemical collection program mainly collects paints and oils and these should be addressed through EPR instruments.

**Global Renewables Ltd** said that mechanical-biological treatment of waste is more effective when contamination is minimised. The company strongly supported 'sustainable resource certificates' (tradeable certificates) for materials of concern to provide incentives to recover these wastes and allow the transparent disclosure of recovery and diversion rates. Contaminants of the organic waste stream also need to be targeted. Priority should be given to HHW and batteries which are the most significant contaminants of municipal solid waste.

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<sup>40</sup> Information supplied by Resource NSW in 2003

<sup>41</sup> 'Community sharps' are defined to include needles, syringes, finger-prick lancets and other sharps generated in non-clinical settings.

There was an urgent need to identify the sources of toxicity in municipal solid waste and garden waste. The company targets the highest net resource value when determining materials for recovery and EPR could help to create market 'pull' for better resource recovery.

**Metalcorp Recyclers** said as recyclers they were not responsible for how products were made but for potentially hazardous or toxic residuals. Recyclers generally have non-acceptance policies covering such materials as explosives, pressure vessels, asbestos, fuel, corrosives, radioactive material, and poisonous or toxic substances, but these sometimes slip through concealed. A bounty of \$10 on gas cylinders would allow \$5 to be paid on return and \$5 to cover the cost of properly degassing cylinders. This could be incorporated in an enhanced HHW program. Hazardous products require EPR.

**Waste Service NSW** noted that, of the 600 tonnes of chemicals collected under the ChemCollect program, 100 tonnes were household chemicals. The service nominated some additional wastes of concern, including waste automotive oil, household medical waste and syringes, car batteries, gas cylinders and fire extinguishers. The service advised that it might in future have to apply a disposal charge to the last three wastes mentioned.

One individual noted that HHW could pose problems for energy-from-waste and said proposals to incinerate mixed residual waste should be firmly rejected.

The **Total Environment Centre** (TEC) included HHW in its Priority Group 2: Hazardous waste which urgently needs to be redirected out of the domestic waste stream and for which EPR is the fairest, most equitable solution to the problem. The TEC suggested that coatings, lubricants, solvents and paints that contain heavy metals should be included in Priority Group 2. The TEC nominated medical waste and pharmaceutical products, chemicals and containers for inclusion in its Priority Group 1: Toxic and biological products that represent a serious risk to public health and safety. Further comments on this category are outlined in 'Community views' in the Agricultural/veterinary chemicals section.

**Hunter Residents Against Sydney Garbage Dumps** said the problem of reducing waste contamination was urgent, especially diverting HHW from landfill. HHW does not have a post-consumer management scheme in place and pharmaceuticals, smoke alarms and batteries lend themselves to take-back schemes. Some mass balance analysis may be required to identify the biggest contributors to toxins. This group said the NSW Government should ban the landfilling of products that produce hazardous waste.

The **Nature Conservation Council** called for facts sheets to be prepared by 2004 on a number of other wastes, including mercury-containing batteries and lead-acid batteries because of their lead content, resource recovery potential, economies of scale, illegal dumping and risk management.

**Lake Macquarie City Council** believed HHW should have priority focus and include gas bottles and motor and cooking oils. **Maitland City Council** said the wastes for priority focus were consistent with the council's issues, especially tyres, household chemicals, batteries and electrical equipment. **Northern Inland Regional Waste** said HHW and refrigerant gases were among their priority wastes. **Port Stephens Shire Council** said the EPA should monitor the product stewardship scheme for used motor oils, while used food oils should also be a waste of concern because of their potentially beneficial resource recovery. **Wollondilly Shire Council** said it was difficult to find a recycler for car batteries.

**Eurobodalla Shire Council** supported the existing scheme for the return of unwanted medicines. The council felt the wastes of concern should also include gas bottles and gases from cooling instruments. Bottles were still being brought to landfill containing gases rather than the gas being collected before the bottles were disposed of. The council agreed with the wastes for priority focus but would add paints, as they are often disposed of illegally through stormwater systems; cause community concern when disposed of to landfill; and are expensive for council to divert to recycling programs. There was no current infrastructure for recycling and disposal that could be used with the support of government and industry.

Programs should become mandatory where voluntary schemes fail and those participating in schemes should not be disadvantaged because of non-participating competitors. Landfill sites and transfer stations should be used as collection points for take-back as well as retail stores and there should be no charge for council participation.

The **Local Government and Shires Associations** acknowledged the work of Resource NSW in this area. It may be difficult to assign responsibility for HHW because of the age of some materials still in homes. However other new potentially hazardous products, such as paints, solvents and pesticides, could be addressed through industry schemes. Once old stocks have been collected, responsibility could shift to manufacturers. ChemClear could provide the model.

The **Plastics and Chemicals Industries Association** said HHW should not be a waste of concern given current collection efforts in Victoria and NSW. The association believed national education could be used to discourage over-purchasing. A national approach to HHW collection would have a range of other benefits, including efficiency, better understanding of material types and collection costs, demographic influences, etc.

The **West Australian Department of the Environment, Water and Catchment Protection** noted that HHW, especially household pesticides and chemicals, was a waste of concern for it. These products are incompatible with secondary waste processing, which many councils are moving towards.

As noted earlier, a number of submissions called for community sharps to be included in this waste category, many from local government.

**Manly Council, Hornsby Shire Council, North Sydney Council** and the **North Sydney Waste Management Professional Officers Group** supported adding community sharps to the wastes of concern as they would lend themselves to a take-back scheme. **Hornsby Council** also believed a deposit system for syringes might encourage their safe return to authorised sites and the levy could finance or part-finance their collection. Levies would need to be large enough to act as a deterrent and combat the potential hazard.

**Warringah Council** said some chemists offer take-back but an industry-level scheme was needed. The council said community sharps should be made a priority over the next 12 months given the potential risk from needle-stick injuries.

The **Manly Greens** considered sharps, such as hypodermic needles, a high-risk waste that would benefit from exchange or take-back programs, which could also provide health and social services to users.

**Marrickville Council** also said syringes and hypodermic needles should be added to the wastes of concern. There is no longer a needle exchange operating in the council's area. A lockable 240-litre mobile garbage bin for biohazard needles and syringes is used that is sent for incineration at a biohazard facility. The council finds it hard to advise the community on safe disposal. Another council is trialling syringe drop-off at its citizen service centre, but Marrickville did not support this approach.

**Southern Sydney Regional Organisation of Councils** also said the wastes of concern should include community sharps.

The **Local Government and Shires Associations** supported EPR for needles, which frequently appeared in domestic waste and recycling. The associations said a NSW Health survey in 2002 found that 42% of councils had problems with needle disposal and 15% had reported needle-stick injuries in the previous 12 months. The three major suppliers and producers of syringes in Australia, overseen by the Medical Industry Association of Australia, should be targeted for an EPR scheme.

**Manly Council, North Sydney Waste Management Professional Officers Group, North Sydney Council, Waste Service NSW, Southern Sydney Regional Organisation of**

**Councils, Total Environment Centre and Warringah Council** all believed that domestic medical wastes, such as incontinence pads and baby nappies, should be identified as wastes of concern because they are a post-consumer health and safety issue and/or a waste of resources.

### *Current action*

#### **CLEANOUT program**

In March 2003, Resource NSW launched its CLEANOUT program using the slogan 'Clean out chemical clutter the right way'. CLEANOUT provided outlets for households to dispose of the following domestic chemicals and wastes:

- paint and paint-related products (thinners, strippers, varnish, etc.)
- pesticides and herbicides, including fungicides, baits/poisons, wood preservatives
- solvents and household cleaners
- motor oils and fuels
- batteries
- gas bottles
- fire extinguishers
- flares
- pool chemicals
- acids and alkalis
- hobby chemicals (photography chemicals, etc.).

Resource NSW worked with 61 councils throughout the Sydney, Hunter and Illawarra regions to provide weekend drop-off centres for the free disposal of these wastes from homes. The drop-offs were scheduled generally for one weekend per location between March and June 2003.

Information on the location and date of the drop-off centre in any particular area was available from the Resource NSW website or the CLEANOUT hotline.

Features of the CLEANOUT program included:

- the use of social research on community attitudes by Woolcott Research to inform the marketing strategy and define target audience (Woolcott Research Pty Ltd 2002)
- a marketing strategy by Marketing Methods to develop the message and promotions methodology
- following a tender process, appointment of Waste Service NSW to oversee and coordinate the events, with responsibility for the collection side split between Cleanaway and Chemsal.

The first round of 55 collections commenced in March 2003. Approximately 376 tonnes of problematic wastes were collected, including paints (46% of the total), oils (17%), batteries, predominantly lead acid batteries (16%) and gas bottles (7%).

Surveys of householders attending the collections indicated that 60% of participants were males over 55 years old, who had learned about the collections through local newspapers. Their main reason for taking part was a general clean-up, and the vast majority had not been to a previous collection and were not aware of the permanent facilities that would accept these materials.

Councils have generally been cooperative in promoting CLEANOUT events and providing venues.

Regional waste groups have applied for funding for similar collection programs from Resource NSW under regional waste management plans.

### **Community sharps**

Community sharps have not been accepted at CLEANOUT collections. NSW Health convened a Community Sharps Management Reference Group in February 2003, with representatives of state and local government, waste management authorities and service providers, Diabetes Australia, the Diabetes Educators Association, the Australian Institute of Environmental Health, and the Medical Industry Association of Australia. The group will research needle-stick injuries, seek information on product stewardship models in other countries, and prepare guidelines for managing community sharps in NSW.

### **Paint**

Waste paint comprises a high proportion of materials collected from households in both NSW and Victoria. The Australian Paint Manufacturers' Federation has recently conducted two paint can recycling trials: with Barloworld (Taubmans) and Waste Service NSW at the Lucas Heights transfer station; and with Bunnings and Dulux in Victoria.

The six-month trial recycling program at the Lucas Heights recycling depot collected 2500 kilograms of light-coloured water-based paint, of which only 100 kg was reusable. Of the 2016 cans collected, 92% were four-litre cans and under (Australian Paint Manufacturers' Federation 2003, p.17).

The Victorian trial, conducted over one weekend in March 2003, collected 1800 litres of water-based paint, which was converted into 3000 litres of remanufactured paint product. Dulux offered this product to the Bunnings hardware retail company for sale. One tonne of steel cans was sent for recycling (Australian Paint Manufacturers' Federation 2003, p.17).

The EPA, Resource NSW and EcoRecycle Victoria met with industry representatives in August 2003 to review the trials and assist paint producers design appropriate programs for paint and can recovery and recycling.

## **Office paper**

### *Why is office paper a waste of concern?*

The increasing use of computers in the workplace has accelerated office paper use. Consequently, office paper is a significant waste stream that continues to grow. 'Office paper' in this context includes printing and writing papers, writing pads and envelopes.

A recent audit of nine office buildings by Resource NSW indicated that 39 reams of waste copy paper were thrown out or recycled by every employee each year or 1.7 reams per square metre of office space per year (Resource NSW 2002c). Paper generally comprises about 55% of office waste and has a low recycling rate because of inefficient collection systems that result in poor source separation and high contamination (Resource NSW 2002d).

Although waste paper is increasingly being returned to grades other than packaging, in 2001–02 only 40,000 of the 621,000 tonnes of printing and writing papers produced in Australia were recovered and recycled into the same types of paper (URS Forestry Pty Ltd 2002, p.33). In addition, 5232 tonnes of white office paper from home offices were collected in NSW in 2001–02 through residential kerbside recycling and 4922 tonnes of this was sold or sent for secondary use (NEPC 2002).

The level of recycled content in office paper available in Australia is similar to the range overseas but could be increased. The recycled content of papers available in NSW, both locally produced and imported, is between 35% and 100%, with half being 100% content (Resource NSW 2002b). All local mills are keen to source more office paper.

Most paper and paper products available in Australia are imported and the manufacture of Australian recycled content papers is limited. The only recycled paper mill in NSW is considered a 'boutique' mill as its production is in kilometres per hour compared to high-speed mills in China which produce kilometres per *minute*. The paper made in this mill is a mix of pre-consumer materials including stationer/printer off-cuts and post-consumer waste from milk cartons.

Office paper collected for recycling in NSW is mostly converted into cardboard boxes, then tissues or toilet paper. In Sydney, the majority goes to the mills of two major recycling companies for packaging, with the balance collected by a paper tissue manufacturer. Two-thirds of the office paper collected in NSW is transported to Victoria for processing.

### *Community views*

Submissions received on the Consultation Paper generally agreed with the nominated wastes of concern, with nine submissions specifically commenting on office paper.

The **Total Environment Centre** identified office paper products as a waste of concern because they create serious difficulties for waste management. In its view, office paper products should not have priority focus as they fall within a group of wastes that are already subject to some form of voluntary initiative or do not present an immediate or direct threat to human health or safety.

**Gosford City and Wyong Shire Councils** jointly said that better collection systems were required for office paper, noting that quality is a major driver for collectors. **Wollondilly Shire Council** believed the category 'office paper' should include wrapping, strapping and cardboard boxes.<sup>42</sup>

The **Local Government and Shires Associations** supported programs to reduce paper use and increase use of less environmentally damaging paper (plantation, recycled, unbleached and paper made from short-term renewable crops). The associations strongly supported tax exemptions for using recycled paper. Office paper does not require an EPR scheme but demand for recycled paper needs to be developed through education and favourable taxation systems. The issue needs to be considered nationally with support from the states for taxation reform.

The **Australian Council of Recyclers** queried the inclusion of office paper in the wastes of concern on the basis of volume and low toxicity.

**Metalcorp Recyclers** said that EPR would not bring about significant environmental improvements for products like paper, glass and plastic that can be recycled readily and is more appropriate for complex, hazardous products.

The **Australian Food and Grocery Council** queried whether the 'producer' of office paper is the manufacturer or the company that uses the paper, and whether retailers would have any role in relation to EPR.<sup>43</sup>

**Australian Paper Pty Ltd** sells 40% by volume of the fine writing and printing paper in Australia. These products use locally produced pulp, waste paper and imported pulp as part of

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<sup>42</sup> 'Strapping' is typically plastic and would contaminate the waste stream, while the inclusion of wrapping and cardboard would preclude the recycling of the material into office paper.

<sup>43</sup> The DEC's view is that the 'producer' is the manufacturer, the company or organisation that uses the paper is the 'consumer', and the retailer may have a role in advising consumers about any EPR scheme.

the raw materials for production. The company supported the National Packaging Covenant and the recycling of office waste and would want to ensure that any EPR approach for paper products was viable, equitable and workable. As the local manufacturer and major recycler of local waste paper, it would like to be involved in the development of any EPR scheme and would seek to achieve negotiated targets and objectives in conjunction with the EPA and Resource NSW.

The **Paper Recycling Action Group of Australia** is an industry group seeking to encourage the sustainable recovery of paper and paper board to reduce waste disposal. It supported the goals of *NSW Waste Avoidance and Resource Recovery Strategy 2003* but felt that the Consultation Paper on EPR did not provide a clear link between the operation of an EPR scheme and the achievement of these goals. The group believes that the paper industry is taking responsibility for the life-cycle management of its products and achieving good outcomes, with a recovery rate of over 70% for newspapers (Publishers National Environment Bureau 2003)<sup>44</sup> and cardboard packaging and around 50% for all paper in Australia. Packaging waste and office paper have been the subject of significant industry attention and extensive infrastructure and take-back schemes are in place in NSW. The group would be able to advise on developments to enable ongoing monitoring and evaluation.

### *Current action*

When encouraged, suppliers are willing to expand their range of recycled content papers. The NSW Government's *Waste Reduction and Purchasing Policy* requires all Government agencies and State-owned corporations to buy recycled-content goods and office paper is one of the scheduled items. Contracts to supply NSW Government agencies with recycled-content alternatives have risen from \$50 million in 2001–02 to \$168 million in 2002–03. Paper suppliers have introduced several new recycled-content products in response to increased demand from Government clients.

A waste reduction partnership scheme was launched in July 2003 that aims to recover and recycle 20% of waste paper from 12 major Sydney office blocks and shopping centres. Launching the scheme with AMP Henderson Global Investors, the NSW Environment Minister estimated it would capture between 800 and 1200 tonnes of waste. While this would not significantly reduce the 240,000 tonnes of office paper that goes to NSW landfills each year, it is an important early step in the Government's *Waste Avoidance and Resource Recovery Strategy 2003*.

Macquarie Centre, Chatswood Chase and Warringah Mall will be among the shopping centres involved. The AMP building in the central business district with 48 floors and 2700 workers will divert 75 tonnes of paper, saving up to \$30,000 per annum. The Jesse Street Centre in Parramatta with 20 floors and 2900 workers will divert 118 tonnes of paper annually and save \$16,000. Other participating office buildings include Angel Place, Goldfields House, NRMA House and National Australia Bank House. The NSW Government is seeking further partnerships.

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<sup>44</sup> Australia recycled 72.8% of the newsprint consumed in 2002, the highest rate reported in the world for that year. This was up from 72.4% in 2001. A goal of 74% has been set for 2005.

## Polyvinyl chloride (PVC)

### *Why is PVC a waste of concern?*

Over 200,000 tonnes of PVC is used in new products in Australia each year, with an estimated 10,000 tonnes disposed of to Sydney landfills annually. Unwanted PVC can be recycled into new products. Vinyl chloride monomer, the raw material from which the resin is made, can be hazardous to human health and the environment if not handled properly.

There are three main problems associated with PVC during waste management:

- PVC can be a source of chlorine in energy-from-waste facilities which may release dioxins to the atmosphere if inappropriate technology is used.
- During the recycling of mixed plastics, the presence of PVC may cause the formation of hydrochloric acid, which can damage machinery and is an occupational health and safety risk for workers.
- Some plasticisers or additives in PVC may limit recycling or reuse options.

In November 2002, the Vinyl Council of Australia committed to a voluntary product stewardship scheme to promote improved environmental practices.

### *Community views*

Submissions received on the Consultation Paper generally agreed with the nominated wastes of concern. Only eight submissions specifically commented on PVC, two of which suggested that it should not have been nominated as a waste of concern and one which recommended that PVC should have high priority.

One individual said the EPA should discourage the use of any product that contains PVC.

**Hunter Residents Against Sydney Garbage Dumps** called for PVC to be added to the list of priority wastes of concern currently without a post-consumer management scheme.<sup>45</sup>

The **Total Environment Centre** nominated all chlorinated products, particularly PVC, for inclusion in its Priority Group 1: Toxic and biological products that represent a serious risk to public health and safety. More detailed comments on how the TEC would like this group of wastes to be treated are included in 'Community views' in the Agricultural/veterinary chemicals section.

**Eurobodalla Shire Council** said EPR should focus not just on the collection of the end-product but on the manufacturing process, with a view to avoiding the creation of waste in the first place. It said that there are many suitable products that could replace PVC, particularly in food packaging, where PET and HDPE plastic could be used.

The **Local Government and Shires Associations** noted that there was still great debate about the potential and actual environmental health effects of PVC and, while some councils had placed stringent conditions on its use, the associations had resolved to neither support nor condemn its use. They believed that the onus is firmly on the Vinyl Council of Australia to satisfy the community beyond doubt that the effects of PVC are benign. The Vinyl Council could take more responsibility for the post-consumer management of PVC, which currently mainly goes to waste, rather than being productively reused and reprocessed.

The **Australian Industry Group** did not support regulation where there were voluntary product stewardship schemes, such as that agreed to by the Vinyl Council. Following this

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<sup>45</sup> A scheme has been launched, as noted above.



industry commitment, the Commonwealth Department of the Environment and Heritage had commissioned a study into end-of-life issues for PVC and this will provide a basis for setting future objectives for the industry.

The **Plastics and Chemicals Industries Association** also believed that PVC should not be included as a waste of concern given the Vinyl Council's plan to launch a national product stewardship scheme. A nationally consistent program was needed to drive improvement.

The **Vinyl Council of Australia** said that PVC should not have been listed as a waste of concern as, in its view, it did not meet the assessment criteria. The council said that numerous life cycle assessments, including reviews completed by the CSIRO in 1996, 1998 and 2001 had found that PVC's adverse environmental impacts were no worse than those of its alternatives (CSIRO 1996; CSIRO 1998; CSIRO 2001). The council cited various studies which concluded that the contribution of PVC waste to the concentrations of heavy metals in landfills was insignificant compared with other sources. Other studies on incineration of PVC had also demonstrated that it:

- has no significant influence on dioxin formation
- may lead to the production of hydrochloric acid but modern incinerators are equipped with scrubbers to deal with this
- may account for 10% of the lead levels found in municipal solid-waste incineration residues but the industry is addressing the use of heavy metal stabilisers.

Addressing the issue of the total volume of PVC waste, the Vinyl Council said that 80% of PVC resin is used in long-life applications (up to 100 years for pipe and fittings), which results in a low level of waste. PVC accounts for only 3% of the total packaging market. The volume of PVC construction and demolition waste is low but is likely to rise as products in service for the past 40 years reach the end of their life.

The Vinyl Council agreed that PVC has good potential for beneficial resource recovery. Building products can be recycled and used to make the same products. Pipe off-cuts are used to make new pipe, and vinyl flooring off-cuts are recycled to produce flooring products. PVC bottles are recycled into resin for pipe fittings and floor coverings. PVC cable is being recycled after metal recovery.

The Vinyl Council submission also addressed concerns that products containing heavy metal stabilisers should not be recycled. The council reported that stabiliser is often reused to stabilise a new product or safely encapsulated, or used to make products where there are no restrictions on their use, such as where there is no contact with food.

The council said energy recovery from PVC could also be achieved in energy-from-waste facilities, particularly for PVC film, which has a higher energy content than rigid PVC. Forty-three percent of PVC is derived from a renewable resource, common salt, and recycle replaces virgin resin on a 1:1 basis.

The Vinyl Council believed that there is little likelihood of illegal dumping and disposal of PVC as it is not a hazardous waste and recycling infrastructure is in place for most post-industrial waste. It considered there is a low level of community concern about PVC waste as it represents a small fraction of the waste stream and does not pose an undue hazard to the community or the environment. The council said it was addressing both waste management and life-cycle issues associated with PVC through its commitment to product stewardship and community participation in the Plastics and Chemicals Industries Association's national community advisory panel. It considers a voluntary agreement on product stewardship to be the most appropriate mechanism for achieving positive outcomes as it will engage the whole supply chain and provide a level playing field. The industry is addressing community concerns about the use of heavy metal stabilisers in its products and had committed to phasing out cadmium by 31 December 2003.

## *Current action*

In November 2002, the Australian PVC industry released a voluntary product stewardship commitment to promote improved environmental practices. The commitment covers issues in the production and management of PVC waste, as well as monitoring international and national developments in scientific research relevant to the potential health and environmental impacts of the PVC product life cycle.

The 33 signatory companies include the resin manufacturer, PVC compounders, manufacturers of PVC products, raw material suppliers, service providers to the industry and the major recycler.

The industry has committed to reducing the toxicity of stabilisers and plasticisers used in production by:

- phasing out the use of cadmium stabilisers
- no longer using lead stabilisers in pipe specified for potable water supply and where scientific evidence indicates the potential risk to human health and the environment is unacceptable
- reviewing the feasibility of phasing out the use of lead stabilisers in all applications and establishing a schedule for phase-out by December 2003
- monitoring the environmental and health impacts of the use of phthalate plasticiser and ceasing its use where scientific evidence shows these to be unacceptable.

The industry will manage PVC waste by:

- devising programs with major developers and waste managers to recycle PVC pipe off-cuts from construction sites
- monitoring overseas developments in the recovery and recycling of PVC products with a view to their implementation in Australia
- assisting the Department of the Environment and Heritage in an independent review of the impediments to recycling PVC products in Australia (DEH 2003b).

The commitment calls for full public reporting on progress annually, with a major review after five years.

## Treated timber

### *Why is treated timber a waste of concern?*

Treated timber includes both hardwood and softwood treated with preservatives (fungicides and insecticides) containing chemical substances such as copper, chromium, arsenic, creosote and tributyl-tin naphthenate (TBTN). The use of these preservatives extends the life of the building materials used in houses and other timber structures, with significant benefits to the community. Some government agencies require the use of only treated timber<sup>46</sup> or strongly support its use through performance-based regulations (Office of Fair Trading).

Copper and chromium are metals and arsenic is a metalloid. The three have been used together to preserve timber for some time. Chromium and arsenic are known human carcinogens, while copper is toxic to aquatic organisms. TBTN is known to have endocrine-

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<sup>46</sup> See Australian Quarantine Inspection Service, cargo containers, quarantine aspects and procedures at [www.affa.gov.au/](http://www.affa.gov.au/)

disrupting potential.<sup>47</sup> Creosote contains 150 different chemical compounds, mostly polycyclic aromatic hydrocarbons (PAHs), which are known carcinogens. Humans and the environment can be put at risk if exposed to these chemicals at high enough levels.

Treated timber may be a source of these chemicals entering the environment. While the US Environmental Protection Agency (US EPA) has not concluded that wood treated with copper chrome arsenate (CCA) poses unreasonable risks to the public, it considers any reduction in potential exposure to arsenic is desirable, given that it is a known human carcinogen. As a result, the US EPA is facilitating the voluntary phase-out of the use of CCA-treated timber in domestic applications.

At the end of its in-service life, treated timber waste is generally directed to landfill, along with other construction and demolition waste. Approximately 350,000 tonnes of timber waste are landfilled annually in the Greater Sydney Region, but the share of treated timber is not known because it is generally difficult to identify what waste timber has been treated at the end of its life (it may have been painted). However it is thought to comprise between 10 and 50% of timber disposed of to landfills.

Treated timber waste is a problem because:

- increasing quantities are being disposed of to NSW landfills
- there is a lack of information about available waste management options for treated timber waste
- there appear to be no practical recycling opportunities for treated timber
- timber preservatives may contaminate mulches and composts and create unacceptable environmental problems if they are burned without appropriate emission control equipment
- inappropriate disposal of treated timber can cause localised air emissions, leachate problems in unlined landfills or low-level land contamination if applied as a mulch.

Timber that has not been treated properly to fix the chemicals in the timber will pose a greater risk of harm to human health and the environment both while in-service and as a waste, due to the higher likelihood of toxic chemicals leaching from the timber.

### *Community views*

Submissions received on the Consultation Paper generally agreed with the nominated wastes of concern, but only four specifically commented on treated timber. Two of these felt that treated timber should have priority focus.

One individual noted that CCA or creosote were most commonly used to treat timber. Treated timber should have priority focus as there is currently no scheme to reduce the impact of this waste; arsenic can leach into soils and underground aquifers when the waste is dumped in unlined landfills; and the waste can generate toxic air emissions and ash concentrations. The individual advised that the use of treated timber is growing, citing as an example the increase over the last decade in the number of Australian wineries from 600 to 1300. The level of community concern about the waste is demonstrated by the fact that it is being phased out in Europe, the United States and Canada, and the Australian Pesticides and Veterinary Medicines Authority is reviewing it.

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<sup>47</sup> Chemicals that affect the health of organisms by either mimicking or blocking the action of hormones, resulting in inappropriate responses, preventing responses altogether, or interfering with processes that make, excrete or transport hormones, are known as 'endocrine-disrupting' chemicals. Evidence suggests that the impact of endocrine-disrupting chemicals on organisms may increase the risk of cancer, malformations, infertility and sterility.

This submission also suggested that there is an urgent need to:

- prevent further contamination of recyclable wood
- develop appropriate technology to identify CCA-treated timber at waste collection centres
- develop firm guidelines for composting of waste timber treated with CCA
- promote alternative products, such as playground equipment made of recycled plastics or rubber.

There are currently no strategies to recycle CCA-treated timber and landfilling is the only option. The individual concluded that treated timber should therefore be considered a national waste priority by the Environment Protection and Heritage Council.

The **Total Environment Centre** included treated timber in its Priority Group 2: Hazardous waste which urgently needs to be redirected out of the domestic waste stream and for which EPR is the fairest, most equitable solution to the problem.

The **Local Government and Shires Associations** acknowledged the dilemma relating to the treatment of timber, which increases its life but ultimately results in environmental impacts during and after its use. Their only comment on this product was that chemical companies should ultimately bear the extended producer responsibility for the environmental impacts of the chemicals.

**State Forests of NSW** said that CCA treatment of timber has significant advantages in extending the service life of timber structures and encouraging the use of an energy-efficient and renewable resource. It recognised that inappropriate use and disposal of treated timber might pose risks to human health and the environment and expressed interest in contributing to any further consideration of EPR for treated timber.

### *Current action*

In 2002, the EPA chose the wood preservation industry to pilot a new 'comprehensive' approach to auditing the environmental compliance of licensed premises. A key aim was to improve industry's environmental performance.

In March 2003, the Australian Pesticides and Veterinary Medicines Authority (APVMA), which is the national regulator of agricultural and veterinary chemicals, announced that it would review the registration of arsenic-based timber treatments, including CCA. The decision followed international reports of new scientific information suggesting possible risks associated with the use of treated timber.<sup>48</sup> The scoping document for the review identified a number of environmental concerns about arsenic timber treatments, including the burning of waste timber treated with CCA, and noted that there are serious gaps in knowledge about arsenic-treated timber in landfills.

The EPHC Waste Working Group considered CCA-treated timber in February 2003 and resolved to write to the APVMA about the potential environmental impacts of treated timber in the waste stream. In May, the Waste Working Group identified a number of issues for consideration in connection with the APMVA review:

- Environmental audits of wood preservation facilities in NSW and Victoria had indicated that industry standards for environment protection during production were not comprehensive. This could increase the risk of chemical contamination of surface waters, ground water and soil at the facilities, as well as lead to the sale of treated timber in which the preservative has not been adequately fixed.

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<sup>48</sup> Details on overseas action are outlined in Appendix III.

- Various studies had revealed potential environmental and health impacts from arsenic leaching from treated timber during its handling and use in construction, and throughout its life. Environmental concerns had also been raised in the context of recent bushfires as the ash residue of burnt treated timber may present an exposure risk to humans and animals and has the potential to contaminate land and water.
- Timber treated with arsenic created problems for the management of waste timber, because it is difficult to identify and separate. Contamination of the waste timber stream with treated timber may undermine the viability of resource use and recovery options. Treated timber could contaminate compost and other material that may be produced from timber waste. If the timber waste is used for energy recovery, expensive emission control equipment may be required. The end result of this contamination might be that all waste timber would have to be disposed of to landfill. There is limited understanding of the long-term impacts of treated timber in landfills and the problem may have not peaked as large quantities of treated timber are yet to reach the end of their life.

In June 2003, the EPA released two reports (EPA 2003a) relating to an audit of five of the 11 NSW licensed timber preservation facilities, and a review of best environmental management practices at the plants. The audit showed that environmental management needed to improve, particularly in relation to managing surface water and avoiding contaminating ground water. The EPA announced that it would build on the audit program by conducting a detailed review of all wood preservation environment protection licences in NSW to further tighten controls on the industry. While the EPA has identified best practice environmental controls for these facilities, the use of CCA as a timber treatment may need reconsideration, particularly as other non-arsenic based timber treatments are now available in Australia.

In its submission on the scope of APVMA review in June 2003, the EPA suggested that, in light of its audit program and the persistence of the pesticide treatments being used especially in domestic situations, the review should address the following critical factors:

- the need for these products and the availability of safe and effective alternatives
- current industry standards and practices
- the life-cycle impacts of the products during application, use and disposal on the environment, human health, occupational health and safety, and agriculture.

In July 2003, the APVMA Board advised industry that it would stop the use of CCA as a timber treatment in certain domestic situations, such as decking and children's playground equipment, by the end of 2003 unless there was conclusive proof that its continued use was safe. With scientific opinion divided on whether CCA is a significant hazard, the Board considered it should take a highly protective approach. The Board noted that, in the United States, these products were being phased out by the end of 2003 at the request of industry (APVMA 2003b). APVMA included advice on frequently asked questions about arsenic-based timber treatment on its website in August 2003 (APVMA 2003a).

In December 2003, APVMA released a draft report for public comment which recommended no further use of arsenic-treated timber products for children's playground equipment, picnic tables, decking and handrails (APVMA 2003c).

## Whitegoods residuals

### *Why are whitegoods residuals a waste of concern?*

Metal shredding of whitegoods produces residuals, including plastics and contaminants such as heavy metals and oils, which can be up to 25% of the weight of the original product. This residual material can pose problems in landfill, such as contamination of ground water from

leachate containing heavy metals and, in the case of fire, dioxin and furan emissions from the flame retardants in plastics.

Some residuals from whitegoods re-manufacturing and recycling require special treatment because of the presence of ozone-depleting chemicals in the insulating foams and the refrigerants. In some European countries, the metal-shredding operation is undertaken in a vacuum so that the ozone-depleting chemicals can be recovered. Strategies to de-gas and disassemble motors, other valuable parts and plastic components could be developed by industry.

### *Community views*

Only five submissions commented on whitegoods residuals.

One individual said whitegoods residuals should be included in the electrical products category.

The **Local Government and Shires Associations** believed there was a need to manage ozone-depleting chemicals during the disassembly of whitegoods.

The **Australian Council of Recyclers** supported exempting recyclers from paying the waste levy on residual material requiring disposal. Any revenue lost to the Government should be recovered from producers of the wastes of concern. The waste levy adds to recyclers' costs and effectively limits recovery to metropolitan areas because of high transport costs. Alternatively, the levy could be rebated to recyclers who can demonstrate best practice with waste producers again meeting the costs.

**Metalcorp Recyclers** said there must be a shift in responsibility for residuals from recyclers to the stakeholder who has the most responsibility to influence the use of toxic and hazardous materials in production. EPR would encourage 'design for the environment' and 'design for recycling'. For every tonne of residuals, 10 times that quantity of whole products have been diverted from landfill. Currently, no consideration is given to the fact that waste products with hazardous components may be accepted at some landfills, but residuals may be classified as hazardous waste, which is subject to specific requirements. Metalcorp believes that the waste classification system raises waste disposal costs, without lowering the pollution load in landfills.

The **Australian Industry Group (AIG)** said disposal of shredder residuals is becoming expensive as commodity prices decline in real terms. AIG believed the disposal of residuals needed to be addressed in a manner that does not discourage recycling or promote concealment of unacceptable materials in waste.

### *Current action*

'Current action' in the End-of-life vehicle residuals section discusses national developments in relation to shredder floc.

A program called Refrigerant Reclaim Australia (RRA) spreads the cost of reclaiming and safely destroying surplus ozone-depleting refrigerants across industries using new refrigerants. The program is funded by an industry-wide levy of \$1 per kilogram of refrigerants produced or imported. The revenue is held in a trust fund that pays for collecting and reprocessing reclaimed ozone-depleting substances. It is mandatory for wholesalers to take back the material either for reprocessing or safe destruction.

RRA was formed by industries concerned to share the cost of this extended producer responsibility across the whole industry. The Australian Competition and Consumer Commission has authorised operation of the program for 10 years. A nationwide network of collection points has been established.

## **Appendix I: Submissions received on the Consultation Paper**

### *Environment/community groups (7)*

Charity Computers  
Clean-Up Australia  
Hunter Residents Against Sydney Garbage Dumps  
Nature Conservation Council of NSW  
The Manly Greens  
Total Environment Centre Inc.  
Waste Crisis Network

### *Individuals (7)*

Drerup, M.  
Godson, W.  
Grieve, I.  
Jenkin, M.  
Laffan, T.  
McCormack, L.  
Woodroffe-Hill, M.

### *Industry (36)*

Anabran Investments Pty Ltd  
Australian Council of Recyclers Inc.  
Australian Electrical and Electronic Manufacturers' Association and Consumer Electronics Suppliers Association (joint)  
Australian Environment Business Network  
Australian Food and Grocery Council  
Australian Industry Group  
Australian Information Industry Association  
Australian Paper Pty Ltd  
Australian Tyre Recyclers Association  
Avcare Ltd  
Beverage Industry Environment Council  
C&R Tyre Recycling Pty Ltd  
Cement Industry Federation  
Coles Myer Ltd  
Devote Pty Ltd  
Ecoflex Australia  
Environ Australia Pty Ltd  
Federation of Automotive Products Manufacturers  
Global Renewables Ltd  
HMR Central Processing Facility, Australia  
IBM Australia  
Insurance Australia Group Ltd  
McCoy Global Resources Pty Ltd  
Metalcorp Recyclers  
Motor Traders' Association of NSW  
NSW Farmers' Association

NSW Minerals Council  
NSW Tyre Recycling Council  
Paper Recycling Action Group of Australia  
Plastics and Chemicals Industries Association  
Rubber Recycling Pty Ltd (3)  
The Marketplace Company Pty Ltd  
Vinyl Council of Australia  
Visy Recycling

*Local government (23)*

Cabonne Shire Council  
Campbelltown City Council  
Cooma-Monaro Shire Council  
Eurobodalla Shire Council  
Gosford City and Wyong Shire Councils (joint)  
Holroyd City Council  
Hornsby Shire Council  
Lake Macquarie Council  
Lismore City Council  
Local Government and Shires Associations of NSW  
Maitland City Council  
Manly Council  
Marrickville Council  
North East Waste Forum  
North Sydney Council  
North Sydney Waste Management Professional Officers Group  
Northern Inland Regional Waste  
Port Stephens Shire Council  
Riverina Eastern Regional Organisation of Councils  
Southern Sydney Regional Organisation of Councils  
Sutherland Shire Council  
Warringah Shire Council  
Wollondilly Shire Council

*NSW Government (10)*

Hunter Water Corporation  
National Parks and Wildlife Service  
NSW Agriculture  
Office of Fair Trading, Department of Commerce  
PlanningNSW  
Royal Botanic Gardens  
State Forests of NSW  
Sydney Catchment Authority  
Sydney Water  
Waste Service NSW

*Other government [3]*

Department of the Environment, Water and Catchment Protection (WA)  
Environmental Protection Agency (Qld)  
Environment Protection Authority (Vic)



## **Appendix II: Fact sheets on the wastes for priority focus**

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## Fact Sheet: Used tyres

### Assessment criteria

#### ***Detrimental environmental and/or public health impacts resulting from the recovery and/or disposal of the product***

Used tyres are an inert waste that persists in the environment. Tyres, particularly when left in stockpiles, have potentially adverse environmental impacts and pose threats to public health and safety.

Because of their chemical make-up, burning tyres are extremely difficult to extinguish and can cause severe air pollution. A fire at a retail tyre outlet in Sydney in 2002 caused the hospitalisation of people from surrounding areas due to respiratory concerns. The runoff of water used in fighting tyre fires also has the potential to pollute waters.

Data is currently limited on the toxicity of tyre leachate to terrestrial organisms. However preliminary studies indicate that leachate from tyres may, under certain circumstances, be toxic to aquatic organisms. Leachate from tyre pieces and crumbs appears to be more toxic than leachate from whole tyres, but only whole tyres are likely to be used in the aquatic environment (EPA 2001a).

Dumped tyres can provide habitat for weeds and have an impact on visual amenity. Water in dumped tyres can be a suitable environment for breeding mosquitoes, which are a nuisance and a health hazard.

The disposal of tyres to landfill can cause solid waste management problems.<sup>49</sup> Whole tyres consume large amounts of space and contain voids, which allow the movement of gases and liquids. Buried whole tyres have been reported to rise back to the surface and to destabilise compacted landfills.

Tyres used as a fuel can result in emissions of dioxins and furans in a manner similar to other fuel sources such as coal.

#### ***Total volume of waste requiring disposal and/or the percentage of the waste stream it comprises***

The DEC has reviewed its estimates of waste tyres in consultation with the tyre industry. It is estimated that 170,000 tonnes of waste tyres are generated each year in Australia, equivalent to around 18 million passenger tyres (EPHC 2002). As NSW accounts for 30% of vehicle registrations (ABS 2002),<sup>50</sup> approximately 51,000 tonnes of waste tyres are generated each year.

Industry claims that around 8000 tonnes (or 16%) of used tyres are exported from NSW.

It is estimated that approximately 25,500 tonnes (50%) of used tyres are disposed of to landfill in NSW each year. Recently, some NSW rural councils have developed approaches aimed at reducing or eliminating the need to landfill tyres. Tyre retailers in these areas are finding it difficult to dispose of tyres legally.

#### ***Potential for waste avoidance, reuse or beneficial resource recovery***

Tyres are large, discrete objects that lend themselves to separate collection and transport systems. Used tyres usually accumulate at tyre dealerships, garages, etc.

Retreads are the reuse of highest value for passenger vehicle tyres but demand for passenger retreads has been declining since the introduction of the Goods & Services Tax, which increased their price relative to new tyres. Retreads also eventually require recycling or disposal.

<sup>49</sup> The disposal of whole tyres is banned in the Sydney Metropolitan Area/Extended Regulatory Area.

<sup>50</sup> Previously, the EPA estimated the NSW share of waste tyres on the basis of population share (36%), not share of registrations (30%).

A number of resource recovery options exist: tyres can be crumbed for use in consumer products (such as rubber mats and carpet underlay), asphalt, bitumen and building products. In NSW, it is estimated that 11,000 tonnes of tyres (22%) are crumbed for these uses. A number of these applications have the potential for significant growth. The crumbing process results in some residual waste which is sent to landfill. A further 3000 tonnes are used in civil engineering and building (6%).

Tyres have energy-from-waste potential in cement manufacturing and electricity generation. The energy value of used tyres is comparable to coal. Another potential means of resource recovery is to convert tyres (via pyrolysis) to oil and other products. This is considered to be a low-value recycling outcome at this stage that would require subsidies to be economic.

***Potential to contaminate other waste streams and limit opportunities for resource recovery***

There are good collection systems for used tyres so they are well separated from other wastes. They are an inert waste that typically does not contaminate other waste streams.

Tyres on end-of-life vehicles affect recovery of residual waste and the profitability of metal recovery.

***Likelihood of illegal disposal through dumping or littering***

The industry believes that less than 1% of tyres are illegally dumped and about 5% are illegally stored. The DEC is currently investigating five sites in Sydney involving a total of 700 tonnes of tyres that have been illegally dumped or stored. This equates to 1.4% of waste tyres in NSW. Illegal storage/dumping has occurred in other parts of the State with smaller scale dumping managed by local councils. The size of illegal dumps/stores can vary significantly from year to year.

Councils that restrict or limit the disposal of used tyres may need to develop strategies to deal with potential illegal dumping. Used tyres are not usually regarded as litter.

***Level of community concern about the waste***

The DEC's consultation process demonstrates wide support for used tyres to be given priority focus for action over the next 12 months, particularly as they are a national waste priority and there has been little progress under a former Industry Waste Reduction Plan in NSW.

***Extent to which EPR is the appropriate tool for managing the waste***

EPR is an appropriate tool for managing used tyres. Tyres have a low or negative value as a waste and a moderate to high environmental impact if inappropriately stored or disposed of.

There are two Australian tyre manufacturers: Bridgestone and South Pacific Tyres. Import levels fluctuate, depending on the strength of the A\$ and the degree of overseas competition. Profit margins in the industry are currently low because of import competition.

There are about 1500 generators of used tyres in NSW comprising tyre dealers, motor vehicle dealers, automotive dismantlers and tyre retreaders. There are a small number of used tyre transporters, with one company accounting for 60% of the tyres collected in NSW. Shredding occurs at a number of landfills but there are only a few firms working in this field.

The sectors within the industry – manufacturers, retailers and recyclers – are well-organised, so there is a reasonable capacity for any EPR scheme to influence the whole supply chain. Systems for the collection of used tyres have already been developed and recycling could increase with further market development. A national product stewardship scheme is under development for consideration by the Environment Protection and Heritage Council.

Current control measures in NSW include a ban on landfill disposal of whole tyres in the Sydney Metropolitan Area/Extended Regulated Area in NSW and other mechanisms, including controls to prevent burning and illegal dumping and to license the transport, storage and processing of large quantities of tyres.

EPR schemes have been introduced in a number of overseas countries (see Appendix III).

## Fact Sheet: Computers

### Assessment criteria

#### ***Detrimental environmental and/or public health impacts resulting from the recovery and/or disposal of the product***

Computer components, such as lead, cadmium and flame retardants, can have adverse impacts on human health and the environment. Circuit boards, batteries and the glass in cathode ray tubes (CRTs) contain hazardous materials such as lead, mercury and hexavalent chromium. CRT monitors contain about 2 kilograms of lead on average, with the exact amount depending on the size and make.

Computers that are disposed of should be sent to landfills designed and managed to minimise adverse environmental impacts, with leachate management systems which collect lead and other materials.

Electronics equipment has been cited as a leading source of mercury in municipal waste. For example, mercury can leach out when circuit breakers are destroyed and metallic mercury is able to vaporise, adding to air emissions.

Lead in waste computers can be dissolved in acidic ground water and contribute to heavy metal leakage from poorly managed landfills. Despite collection and treatment of leachate at controlled landfills, contaminated sludge is still being landfilled.<sup>51</sup>

Brominated flame retardants are commonly added to the plastics used in electronics. These substances are either human or environmental toxicants. They can be released into the environment through landfill leachate, if improperly handled (US EPA 2001).

The rapid obsolescence of electronic equipment is inefficient, as is the use in their manufacture of non-renewable resources that cannot be readily reused or recycled.

#### ***Total volume of waste requiring disposal and/or the percentage of the waste stream it comprises***

It is estimated that 5000 tonnes of computers are disposed of to landfill every year in NSW. Modelling of industry figures by Meinhardt Infrastructure and Environment Group (Environment Australia 2001a) estimated that by 2006 there would be 1.6 million computers disposed of to landfill nationally, 1.8 million sent to storage (in addition to the 5.3 million already in storage) and 0.5 million recycled. This report indicates that around 1.5% of computers are disposed of to landfills.

#### ***Potential for waste avoidance, reuse or beneficial resource recovery***

There is a high potential for waste avoidance, reuse and resource recovery of computers and their components.

Industry has developed new technologies and designs to minimise the levels of hazardous components in computer equipment. This includes finding alternatives to lead solder and introducing flat screen monitors to replace CRTs. Other design initiatives include strategies to improve the disassembly of computers and to label plastics that can be recycled.

Markets for second-hand computers and parts have grown significantly in the last five years as the advantages of upgrading computer technology have declined. Second-hand computers are substantially cheaper than new models and can perform many functions adequately. Major retailers are selling second-hand computers with warranties.

Obsolete computers are being disassembled for material reprocessing. Additional efforts are needed to lower the costs of reprocessing plastics and glass from CRTs.

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<sup>51</sup> The hazard characteristics of waste electrical and electronic equipment, including the risks associated with landfilling and recycling, have been extensively documented in Europe. See Commission of European Communities (2000).

The software on an end-of-life computer may be valuable and increase the potential for the equipment to be recycled. However, there are issues with software copyright and information security.

A number of initiatives are working to improve recovery and recycling of computers but more work is needed in this area. Products should be designed with fewer hazardous components (DEH & DEC in press).

***Potential to contaminate other waste streams and limit opportunities for resource recovery***

Hazardous components in computers can limit opportunities for material recycling and waste treatment.

The heavy metals and flame retardants in computers would increase the costs for establishing and operating energy-from-waste facilities. Additional gas-scrubbing equipment and ash treatment may be required, depending on the design and operation of the energy-from-waste facility or feedstock quality. Improved collection and disposal systems may be required to divert materials such as CRTs and plastics.

***Level of community concern about the waste***

The DEC's consultation process demonstrates that there is support for computers to be given priority focus for action over the next 12 months. They are also a national waste priority.

***Extent to which EPR is the appropriate tool for managing the waste***

EPR is an appropriate tool for managing computers. In 1998, the NSW Government held a round-table meeting with industry to discuss end-of-life options for computers. Following this, in 1999, industry approached the Australian and New Zealand Environment and Conservation Council (ANZECC) with an undertaking to develop a voluntary national product stewardship scheme for electrical equipment, including computers. The council's successor, the Environment Protection and Heritage Council, is now seeking industry commitment to a national product stewardship scheme, which it would like to see implemented as a priority.

While there are over 500 brands in the personal computer market in Australia, the top five account for 58% of the market. Although there is some local assembly, most computer hardware is imported from companies based in the United States and Japan. The level of importing affects the ability of Australian businesses to take unilateral action, particularly in relation to product design. One major retailer, Harvey Norman, currently has 40% of the computer retail market (DEH & DEC in press).

The Australian Information Industry Association represents the major brand owners. Other firms will need to be involved if any EPR scheme is to influence the whole supply chain. Systems for recovering and recycling computers have matured significantly over the last five years. Individual companies, such as Dell, have implemented take-back schemes for household computers.

EPR schemes have been introduced in a number of overseas countries (see Appendix III).

## Fact Sheet: Televisions

### Assessment criteria

#### ***Detrimental environmental and/or public health impacts resulting from the recovery and/or disposal of the product***

Circuit boards, standby batteries and the glass in cathode ray tubes (CRTs) contain hazardous materials, such as lead, cadmium, mercury and chromates, that may have an adverse impact on human health and the environment when televisions are disposed of, or limit opportunities to recover and recycle materials. The average CRT television screen contains two kilograms of lead (although this is decreasing) and this could contribute to leakage of heavy metals from poorly managed landfills. Brominated flame retardants are commonly used in the plastics and on printed circuit boards.

The rapid obsolescence of televisions is inefficient, as is the use in their manufacture of non-renewable resources that cannot be readily reused or recycled.

#### ***Total volume of waste requiring disposal and/or the percentage of the waste stream it comprises***

Industry advises that 1.2 million televisions are sold annually in Australia and that 120,000 of these are made locally.<sup>52</sup> It is estimated that between 5000 and 15,000 tonnes of televisions are disposed of to landfill in NSW each year.

New technology associated with the move to digital televisions in 2008, flat screens and home theatres may accelerate disposal of older and superseded sets in the medium term. As yet digital take-up has not been significant, but this is expected to increase as a greater range of equipment becomes available. However, many consumers will be able to access digital broadcasting with the use of set-top box decoders so wholesale disposal of analogue technology is not expected.

#### ***Potential for waste avoidance, reuse or beneficial resource recovery***

There is potential for waste avoidance, reuse and resource recovery of televisions and their components. The components used to manufacture televisions are generally made from non-renewable resources. Improved recovery and recycling will reduce the need to consume these resources. Industry has developed new technologies and designs to minimise the level of hazardous components in televisions. This includes finding alternatives to lead solder and introducing flat screen monitors to replace CRTs. Other design initiatives include strategies to improve the disassembly of televisions and to label plastics that can be recycled.

The move to digital televisions planned from 2008 will result in the disposal of more analogue televisions. Over the next 10 years, as the price of flat screen televisions falls, sales of models with CRTs is likely to gradually decline. Although flat screens are more complex to manufacture, there are associated advantages such as lower energy use in operation, less packaging, reduced environmental impacts from distribution and transport because of their lighter weight and, most importantly, the absence of lead in the glass. Careful consideration of the component chemistry of liquid crystal screens is needed.

Many manufacturers of entertainment equipment are replacing standby batteries containing problematic materials, such as cadmium, with batteries that have lower environmental impacts. Tin-based solders are replacing lead solders, with a major television manufacturer in western Sydney making the change-over recently. Careful consideration of the chemistry of alternatives is needed.

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<sup>52</sup> Industry estimate provided at Consumer Electronics Suppliers Association meeting with EPA, 20 March 2003

Opportunities exist to replace problematic flame retardants used in circuit boards and some plastic components with more benign materials. NSW has consumer protection laws requiring electrical equipment to achieve set safety standards and these could be revised to include EPR requirements. Other environmental initiatives already use the consumer safety approval scheme, such as the energy performance standards for some types of electrical equipment.

Overseas studies suggest the metals and plastic components in televisions are not valuable enough to offset the costs of disassembly and recycling CRTs. This could be improved by lowering the cost of CRT recycling through economies of scale, designing for disassembly and establishing disassembly facilities. Systems are in place to recover materials, such as metals, CRTs, printed circuit boards, cables and electronic components such as transformers.

There is some reuse of televisions by households. Second-hand televisions are available commercially at opportunity shops operated by charities. A recent trend has been the use by councils of 'second-hand Saturdays' to minimise the quantities collected in hard waste collections. These events encourage the reuse of televisions across the community, although their electrical safety needs to be checked.

Most obsolete televisions are disposed of by council-operated hard waste collections or delivered to transfer stations or landfills. There are currently no systems in place to collect televisions in NSW and there are likely to be efficiencies from collecting televisions together with more profitable goods such as computers. The key associations have been assessing the lessons learned from the brown goods recovery trial in Melbourne targeting televisions and video cassette recorders (AEEMA, EcoRecycle Victoria & CESA 2003). A number of initiatives are under way to improve recovery and recycling of televisions but more work is needed in this area and there is a need for products to be designed with less hazardous components (DEH & DEC in press).

***Potential to contaminate other waste streams and limit opportunities for resource recovery***

Hazardous components in televisions, especially CRTs, can limit opportunities for material recycling and waste treatment by creating a physical or financial barrier to recovery and recycling of other waste.

The heavy metals and flame retardants in televisions would increase the costs of establishing and operating energy-from-waste facilities. Additional gas-scrubbing equipment and ash treatment may be required, depending on the design and operation of the energy-from-waste facility or feedstock quality. Improved collection, recovery and disposal systems may be required to divert materials such as CRTs and plastics.

***Level of community concern about the waste***

The DEC's consultation process demonstrates that there is support for televisions to be given priority focus for action over the next 12 months. They are also a national waste priority.

***Extent to which EPR is the appropriate tool for managing the waste***

EPR is an appropriate tool for managing televisions. In 1998, the NSW Government held a round-table meeting with industry to discuss end-of-life options for electrical equipment. Following this, in 1999, industry approached the Australian and New Zealand Environment and Conservation Council (ANZECC) with an undertaking to develop a voluntary national product stewardship scheme for electrical equipment, including televisions. A national product stewardship scheme has been proposed by the television industry and will be considered by the council's successor, the Environment Protection and Heritage Council, in April 2004.

The Australian Electrical and Electronic Manufacturers' Association (AEEMA) is the peak industry association representing over 400 members. A division of AEEMA, the Consumer Electronics Suppliers Association (CESA), represents the importers of consumer electronic products into Australia. CESA/AEEMA are developing a scheme for the collection, recycling and disposal of televisions based on an advance recycling fee. Some firms outside these associations will need to be involved if the scheme is to influence the whole supply chain. EPR schemes have been introduced in a number of overseas countries (see Appendix III).

## Fact Sheet: Nickel cadmium batteries, excluding mobile phone batteries

### Assessment criteria

#### ***Detrimental environmental and/or public health impacts resulting from the recovery and/or disposal of the product***

Nickel cadmium (NiCad) batteries are composed primarily of nickel, cadmium, steel and graphite. Rechargeable NiCad batteries are used extensively by both industry and households to provide portable, long-life low-cost power systems. NiCad batteries have been used in small electrical appliances, mobile phones, cordless phones and drills, desktop and laptop computers, shavers and video cameras. They are also used for communications equipment, emergency lighting and emergency power for medical equipment and hospitals.

The most toxic component of NiCad batteries is cadmium, which can cause environmental and health problems if batteries are disposed of inappropriately, such as being damaged or burnt. Batteries with less toxic constituents, such as lithium and nickel hydride, have been substituted for NiCad batteries in portable computers and mobile phones. Alternatives have not yet been developed for high-power applications like power tools and dust busters, but are anticipated.

Future battery-operated appliances may require the use of new materials with less impact on the environment or human health during their recycling or disposal. New chemistries based on lithium have been developed which have lower impacts on the environment during recycling or disposal to landfills.

#### ***Total volume of waste requiring disposal and/or the percentage of the waste stream it comprises***

The number of NiCad batteries entering Australia in 2002 totalled 8.5 million. Of these, 4.6 million were uninstalled and 3.9 million were installed in an appliance. The NSW share was estimated at 3.3 million. In 2002, it was estimated that 2047 tonnes were imported into Australia, comprising 43% installed and 57% uninstalled batteries (EPA 2003b).

The number of NiCad batteries disposed of to NSW landfills is difficult to estimate but is thought to be around 500 tonnes a year. This volume consists primarily of non-recyclable parts from battery disassembly, such as plastic separators. NiCad battery use is in decline but they will remain in the waste stream for at least a decade.

#### ***Potential for waste avoidance, reuse or beneficial resource recovery***

Larger batteries and those able to be separated from industrial equipment are almost fully recovered because of the value of the materials. Batteries are usually exchanged, with old units removed by the supplier.

Smaller batteries and those built into equipment to provide power to an internal clock are not always recovered. These may be a waste by-product when equipment is disassembled for material recycling. However, the more likely disposal route is via a NSW landfill, either directly from equipment disposal or from the residuals of ferrous metal recovery at a shredding facility.

Apart from batteries in mobile phones, most batteries in consumer equipment are not recovered at the end of the equipment's life.

Reuse options for NiCad batteries depend on their use, age and design. Some batteries that have not been properly charged or cycled (the sequence of charging and discharging a battery) may be reused after specialised recharging.

The cost of disassembling small batteries from appliances is a barrier to recovery. Improved designs should enable batteries and other recoverable materials to be disassembled quickly with minimal equipment. Equipment manufacturers may need to develop disassembly guides for material recyclers to enable the identification and recovery of small batteries.



The metals within NiCad batteries have value if recovered. However, the only specialised cadmium recovery facilities are based overseas. There are specialised waste management companies that recover commercially sourced batteries and export them under the Department of the Environment and Heritage's permit system for hazardous wastes.

Some recycling of battery components can be undertaken. Difficulties may, however, arise because of occupational health and safety, consumer warranty or product quality requirements set by customer specifications or Australian Standards. Further work may be required to improve the recovery of some plastic components, such as separators between the cathode and anode. These products must not come into contact with food because of concerns about cadmium or other heavy metals contaminating the plastics.

The glass fibres used as both a separator and a reservoir for electrolyte are currently disposed of to landfill. Disposal options need to comply with the NSW waste regulatory requirements, including licensing and any additional restrictions placed on receiving waste from landfill operators.

***Potential to contaminate other waste streams and limit opportunities for resource recovery***

The heavy metals, cadmium and nickel, may be a barrier to the recovery of materials using composting or energy-from-waste processes because they can contaminate potential organic products and generate air emissions.

NiCad batteries may be inadvertently processed by shredding, crushing or grinding to release high levels of cadmium or nickel compounds into materials which are intended to be composted or processed into waste-derived fuels.

***Level of community concern about the waste***

The DEC's consultation process demonstrated that there is support for NiCad batteries to be given priority focus over the next 12 months to develop an EPR scheme.

***Extent to which EPR is the appropriate tool for managing the waste***

EPR is an appropriate tool for managing NiCad batteries. Possible options include take-back schemes, supported by advance disposal fees, and standardised recycling labels for NiCad batteries.

There are no local manufacturers of NiCad batteries in Australia and 11 major importers. The majority of importers/retailers currently support EPR or product stewardship initiatives in their parent companies overseas and some local retailers have established take-back arrangements.

In NSW waste batteries must comply with general waste regulatory requirements for storage, transport and reprocessing.

Developments overseas in relation to EPR schemes for NiCad batteries are detailed in Appendix III.

## Fact Sheet: Plastic bags

### Assessment criteria

#### ***Detrimental environmental and/or public health impacts resulting from the recovery and/or disposal of the product***

Litter from plastic bags detracts from public amenity and harms wildlife that ingests it or gets tangled up. Evidence indicates that plastic bags are a harmful type of marine debris that affects 20 threatened species. This has resulted in the Commonwealth Government recently listing marine debris as a Key Threatening Process under the *Environment Protection and Biodiversity Conservation Act 1999* (DEH 2003c).

Plastic bags can take hundreds of years to break down, although biodegradable bags may decay more quickly, in favourable light and conditions.

The use of non-renewable resources in the manufacture of plastic bags is inefficient.

#### ***Total volume of waste requiring disposal and/or the percentage of the waste stream it comprises***

Australians use 6.9 billion lightweight bags containing high-density polyethylene (HDPE) annually, just under one bag per person per day. A further 0.9 billion thicker 'boutique' style bags are used (Environment Australia 2002).

Industry advises that many of the lightweight singlet-style bags used each year are likely to be reused as carry bags and bin liners.

Approximately 37,000 tonnes of plastic bag waste are disposed of to landfills each year, 2% of the total plastic produced in Australia each year (Environment Australia 2002).

#### ***Potential for waste avoidance, reuse or beneficial resource recovery***

Plastic bag manufacturers are developing and marketing degradable packaging. They are also participating in trials with retailers of degradable and other types of plastic bags.

Many local councils and shires throughout NSW have joined with environment groups to provide their local communities with alternatives to plastic bags, including calico and heavyweight polypropylene bags.

In March 2003, over 180 councils Australia-wide participated in the *Bag yourself a better environment* campaign run by Clean-Up Australia (Clean-Up Australia 2004b). NSW councils and shires were well represented. Activities included councils linking their existing litter blitz programs to the campaign and local schools receiving calico bags and information brochures. Narrabri Council, for example, worked with members of the Narrabri Shire Youth Council to door-knock businesses and houses, educating people on the importance of recycling plastic bags. Wollongong Council collected 18,000 plastic bags through its exchange bag activity where residents received one calico bag for every 20 plastic bags returned.

Complementary to this, some supermarkets operated bag-free lanes. They also offered shoppers calico and heavy-duty polypropylene bags as alternatives to plastic bags. Councils often promoted these initiatives to the community and in some areas they were a fund-raising activity for local schools: in Gunnedah, Woolworths collected 150 bins full of plastic bags and donated \$5 for each bin (\$750) to the local school.

Some leading NSW retailers are encouraging consumers to return their plastic bags, bring or purchase reusable bags or use boxes. Some are also charging customers for plastic bags.

A number of initiatives are improving recovery and recycling of plastic bags: recovered plastic bags can be made into new bags or plastics for use in the building industry, with most black plastic liners for waterproofing in NSW made from recovered plastics.

The NSW Government has run very successful litter awareness campaigns like *Don't be a tosser* and *Litter – it's in your hands*, which aim to reduce litter, including from plastic bags.

To address the issue of marine debris, the Environment Protection and Heritage Council (EPHC) agreed to the development of a community-based system for monitoring marine litter. The Marine and Coastal Community Network is distributing a brochure, *Keeping Tabs on Marine Debris*, which includes a survey form on marine debris for use by community members helping with beach clean-up days.

**Potential to contaminate other waste streams and limit opportunities for resource recovery**

Polymers and biodegradable bags can limit opportunities for material recycling and recovery and treatment of other waste by creating a physical or financial barrier.

**Level of community concern about the waste**

Many of the inquiries the DEC receives about litter management reflect concern about plastic bag waste and litter.

Plastic bags are also a national waste priority.

The Commonwealth Government's Natural Heritage Trust has been supporting Clean Seas Projects, community initiatives to reduce pollution of coastal marine and estuarine environments, including by plastic bags.

In April 2003, businesses in the township of Coles Bay, Tasmania, agreed to stop handing out polyethylene plastic bags. Randwick and Hunters Hill councils in Sydney and Eurobodalla Shire Council on the south coast are proposing a similar voluntary ban ('Plastic bags will be no go in Mogo', *The Sydney Morning Herald*, 1 September 2003).

**Extent to which EPR is the appropriate tool for managing the waste**

EPR is an appropriate tool for managing plastic bags. The EPHC agreed in August 2003 to the phasing out of lightweight single-use carry bags containing HDPE within five years. The EPHC also agreed that a revised Code of Practice for the Management of Plastic Bags, developed by the Australian Retailers' Association (ARA), would be the key tool for achieving this goal, providing it delivers on Ministers' requirements.

Actions under the Code of Practice include:

- reducing the number of lightweight bags used by 25% by the end of 2004 and by 50% by the end of 2005
- increasing recycling of lightweight bags by between 15 and 30%
- introducing recycled-content plastic bags consistent with their availability
- undertaking a range of education initiatives.

For details on overseas initiatives in relation to plastic bags, see Appendix III.

## Fact Sheet: Agricultural/veterinary chemicals

### Assessment criteria

#### ***Detrimental environmental and/or public health impacts resulting from the recovery and/or disposal of the product***

Unwanted stocks of agricultural/veterinary chemicals may pose serious risks to the environment and human health.

Although no longer registered, organochlorine pesticides can persist for long periods in the environment and accumulate in animals and plants. While the risk of any remaining stocks of organochlorines entering the food chain have been reduced by the ChemCollect program (see below), there is a risk that contamination could still occur from inappropriate disposal of these stocks.

Some pesticides are highly mobile and can move or leach into surface and/or ground water, while others persist in soils and sediment. Where these pesticides or their breakdown products are bioavailable, biota may be harmed.

Pesticide contamination of farm products, such as residues of endosulfan and chlorfluazuron (Helix) in beef, can have a serious impact on international trade.

Misuse or accidental exposure to pesticides can affect human health.

Where these chemicals are disposed of correctly, the risk of any impacts should be small, but if not, the risk is high.

#### ***Total volume of waste requiring disposal and/or the percentage of the waste stream it comprises***

Complete data on the use of agricultural/veterinary chemicals is not available, although a recent report by the Australian Academy of Technological Sciences and Engineering estimated that 5000 tonnes of organophosphate insecticide is used in Australia every year (Australian Academy of Technological Sciences and Engineering 2002).

A national program funded by state and Commonwealth governments, called ChemCollect, has provided for the collection, storage and destruction of hazardous, unwanted and unregistered agricultural/veterinary chemicals. The scheme commenced in NSW in mid-2000 and collections ceased in December 2002. In NSW, 521 tonnes of unwanted agricultural/veterinary chemicals were collected under the program, together with a further 106 tonnes of household chemicals as a number of councils encouraged the surrender of household chemicals at the same time.<sup>53</sup> In 1999, industry agreed to replace the scheme with its own program, called ChemClear.

The appropriate disposal of pesticides is hampered by the generic directions found on most pesticide labels, which commonly recommend burial of pesticide containers and contents in a signposted disposal pit. The need for changes to label directions is recognised, but progress has been slow.

#### ***Potential for waste avoidance, reuse or beneficial resource recovery***

Reviews of older more problematic chemicals by the Australian Pesticides and Veterinary Medicines Authority are resulting in restrictions on their use or their complete removal from the system.

Most new chemical products require lower doses to control pests or diseases and they may also present lower risks.

Market-driven quality assurance programs and increased uptake of integrated pest management and organic farming practices may reduce the use of agricultural/veterinary chemicals.

<sup>53</sup> Waste Service NSW, Presentation to NSW Waste Management Conference, 5 June 2003

Market-driven quality assurance programs and increased uptake of integrated pest management and organic farming practices may reduce the use of agricultural/veterinary chemicals.

Agricultural/veterinary chemicals that are not date-limited and still have an approved label on the container could be reused or returned to the manufacturer. However, most would be disposed of as waste. Current disposal options include treatment at a licensed waste facility, limited treatment via an evaporation pond, or (both undesirable) burial on farm and disposal to the domestic garbage stream.

Better recovery/reduced generation would require changes to product technology and user behaviour, linked to accessible and regular collections.

ChemCollect information indicates there may be problems in identifying agricultural/veterinary chemical wastes, such as those arriving in unlabelled or incompletely labelled containers.

***Potential to contaminate other waste streams and limit opportunities for resource recovery***

Contamination of waste by agricultural/veterinary chemicals may create a barrier to the recovery of materials using composting or energy-from-waste processes, but this depends on the nature of the particular chemicals.

***Level of community concern about the waste***

The DEC's consultation process demonstrates that there is support for agricultural chemicals receiving priority focus over the next 12 months, particularly in monitoring the implementation of the ChemClear program, in terms of participation and recovery rates.

***Extent to which EPR is the appropriate tool for managing the waste***

EPR is an appropriate tool for managing agricultural/veterinary chemicals. The industry association for agricultural and veterinary chemical manufacturers (Avcare) and the National Farmers' Federation agreed in 1999 to develop and implement ChemClear to collect and safely dispose of unwanted chemicals.

It was on the basis of industry's commitment to meet its responsibilities through ChemClear that government agreed to deliver the ChemCollect scheme at a cost of \$27 million, including \$8.66 million for NSW from the State and Commonwealth Governments. Industry has the benefit of two years' ChemCollect experience to help it prepare for the ChemClear scheme.

Members of the national Waste Working Group have expressed concern about the slow progress by industry in implementing ChemClear. In September 2002, the Commonwealth Minister for the Environment and Heritage wrote to the industry partners urging them to confirm their commitment to the timely implementation of ChemClear. Responses by signatories to the ChemClear Agreement indicated that all parties were committed to a smooth and cost-effective implementation of the ChemClear program by January 2004.

The EPA wrote to Avcare in May 2003 seeking details on the extent and nature of the pilot collection and the proposed date for its commencement in 2003. The ChemClear Advisory Committee agreed in July to pilot the scheme in two locations in NSW from October 2003 and commence the progressive roll-out of the full program in 2004.

Overseas developments have been limited in relation to EPR schemes for agricultural/veterinary chemicals (see Appendix III).

## Fact Sheet: Agricultural/veterinary chemical containers

### Assessment criteria

#### ***Detrimental environmental and/or public health impacts resulting from the recovery and/or disposal of the product***

Agricultural/veterinary chemical containers that have not been properly rinsed have the potential to introduce pesticides into the environment if not disposed of appropriately. Pesticides are designed to control pests, usually by killing them, so they are likely to have significant capacity to affect the environment or human health on contact. This is of particular concern in rural areas where pesticides are used intensively.

In Australia, it is recommended practice to triple-rinse or pressure-rinse emptied pesticide containers and pour the rinsate into the spray tank to ensure that very little, if any, pesticide remains in the container. If the containers have been properly rinsed, there should be little risk of harm to the environment or health.

#### ***Total volume of waste requiring disposal and/or the percentage of the waste stream it comprises***

The drumMUSTER program provides for the collection, recycling or disposal of pesticide containers over one kilogram or litre in size manufactured by participants in the program. Customers pay a levy of four cents per kilogram or litre at the point of purchase for the collection, recycling or appropriate disposal of non-returnable containers. The program has received Australian Competition and Consumer Commission approval to extend its coverage to non-hazardous product containers and those with a capacity of less than one kilogram or litre.

drumMUSTER currently operates in 84 (97%) of the 87 NSW/ACT council areas identified as priorities because of the high sales of chemical drums (> 2000 per year). It operates in 122 (71%) of the 173 NSW/ACT local government areas.<sup>54</sup>

drumMUSTER data indicates that 4.65 million waste agricultural/veterinary chemical containers (7067 tonnes) were collected by the program between 1 February 1999 and 5 February 2004.<sup>55</sup> The largest numbers of container types collected have been 2.69 million 20-litre plastic containers (3239 tonnes) and 1.41 million 20-litre steel containers (2539 tonnes).

An audit of drum sales in 2001 estimated that 4.235 million drums were sold nationally, including 1.232 million in NSW. In 2001, the rate of return for drums was 33% nationally and 28% in NSW<sup>56</sup> and 30% nationally in June 2002 (Avcare 2003, p.18).

Thirty per cent of the volume of chemicals sold in 2001 came in refillable containers<sup>57</sup> but this may decline because of the recent imposition of industry charges.

#### ***Potential for waste avoidance, reuse or beneficial resource recovery***

There is some concern that a focus on the recycling of pesticide containers may hamper the development of new approaches to pesticide packaging that would reduce waste. Volumes of pesticide container waste could be reduced by the introduction of water-soluble packaging; concentrated liquid pesticide formulations; concentrated dry pesticide formulations in compostable paper packaging; and bulk pesticide delivery systems.

<sup>54</sup> drumMUSTER statistics, 1 February 1999 – 5 February 2004, [www.drummuster.com.au](http://www.drummuster.com.au)

<sup>55</sup> drumMUSTER statistics, as above

<sup>56</sup> drumMUSTER collection statistics between 1 January and 31 December 2001

<sup>57</sup> Avcare presentation on drumMUSTER, June 2003

The Industry Waste Reduction Agreement that gave rise to drumMUSTER identified a set of goals for the reuse, recycling and disposal of pesticide containers:

- reduce the number of containers entering the distribution stream through the establishment of industry targets aimed at encouraging manufacturers to adopt alternative packaging containers, technology and/or formulations
- ensure non-returnable crop protection and animal health chemical containers have a defined route for disposal that is socially, economically and environmentally acceptable.

The technology to recycle appropriately cleaned (triple- or pressure-rinsed) steel pesticide containers is available. Recyclers involved in drumMUSTER must guarantee that they can provide ongoing markets for the recycled materials processed as a result of their participation. Approved processors are also asked to provide an audit system to ensure proper financial tracking and reporting.

drumMUSTER requires the processing and recycling of both plastic and steel containers, and states a preference for processors that can provide a complete package. drumMUSTER also specifies the following hierarchy of reuse/recycling/disposal options for plastic pesticide containers:

1. Plastic 20-litre containers originally intended for single use are to be forwarded to designated reprocessing contractors.
2. Where this is not possible, plastic containers can be granulated to a size of approximately 1–2 cm to facilitate their use in recycling or material recovery.
3. Where this is not possible, plastic containers can be shredded.

Containers recycled through drumMUSTER are used to make recycled products, such as garbage bins, outdoor furniture, roadside posts, drainage and irrigation pipes, railway sleepers and fences.

***Potential to contaminate other waste streams and limit opportunities for resource recovery***

Contamination of waste by agricultural/veterinary chemical containers could create a barrier to the recovery of materials through composting or energy-from-waste processes, depending on the nature of the chemicals involved.

***Level of community concern about the waste***

The DEC's consultation process demonstrates that there is support for agricultural/veterinary chemical containers receiving priority focus over the next 12 months in order to monitor the implementation of the Industry Waste Reduction Agreement and drumMUSTER program, particularly in terms of participation and recovery rates.

***Extent to which EPR is the appropriate tool for managing the waste***

EPR is an appropriate tool for managing agricultural/veterinary chemical containers. The National Farmers Federation, Avcare, the Veterinary Manufacturers and Distributors Association and the Australian Local Government Association jointly developed the drumMUSTER initiative, which is a national program for the collection and recycling of empty, cleaned, non-returnable crop production and on-farm animal health chemical containers. The parties are signatories to a national Industry Waste Reduction Agreement, which has set targets to:

- recover 66% of clean, empty, rinsed chemical containers through drumMUSTER
- reduce the weight of chemical container waste going to landfill by 68%, compared with 1990
- supply 50% of raw materials in recyclable or returnable packaging.

drumMUSTER has operated since 1999 and was reviewed in July 2000 and July 2002.

## Fact Sheet: Mobile phones and batteries

### Assessment criteria

#### ***Detrimental environmental and/or public health impacts resulting from the recovery and/or disposal of the product***

Some of the components in mobile phones and batteries are made from non-renewable resources.

Heavy metals in mobile phones and batteries, such as nickel, copper and cadmium, may have an adverse impact on the environment if disposed of to landfills or energy-from-waste facilities, and during reprocessing.

The Australian Mobile Telecommunications Association (AMTA) operates a voluntary mobile phone recycling program, which aims to recycle potentially toxic components in mobile phones, their batteries and accessories.<sup>58</sup> The recycling procedure provides a complete breakdown of chemical components to produce marketable commodities such as nickel (used in the production of stainless steel); cadmium (used for new batteries); and plastics (used in furniture).

Recycling also prevents the formation of environmentally damaging compounds, such as dioxins, in the exhaust gas stream during metal recycling.

#### ***Total volume of waste requiring disposal and/or the percentage of the waste stream it comprises***

In Australia, 4–6 million mobile phones and batteries are disposed of or recycled each year, according to AMTA. The industry scheme managed by AMTA had collected approximately 177 tonnes of mobile phones, accessories and batteries by June 2003, including around 250,000 handsets.<sup>59</sup> This included 61 tonnes of batteries, of which 32.5 tonnes contained cadmium.

The quantity of mobile phones disposed of to landfills is low, estimated at less than 500 tonnes per year in NSW.

The rapid development of new models and technology has accelerated the number of obsolete mobile phones and AMTA estimates that Australia's 12 million mobile phone users replace their handsets every 18–24 months.

#### ***Potential for waste avoidance, reuse or beneficial resource recovery***

Some components used in mobile phones or batteries are made from non-renewable resources. Development of new models and technology has increased the number of obsolete mobile phones.

The trend in mobile phone technology has been towards smaller and lighter handsets. When first available 10 years ago, handsets were large and heavy because of the use of sealed lead-acid batteries. Mobile phones use portable rechargeable batteries as their power supply.

When the mobile phone sector changed from analogue to digital, the use of nickel cadmium (NiCad) batteries was discontinued. The alternative nickel hydride and lithium-based batteries appear to have a lower environmental impact than NiCad batteries.

#### ***Potential to contaminate other waste streams and limit opportunities for resource recovery***

Heavy metals in mobile phones and batteries, such as nickel, copper and cadmium, may contaminate waste and create a significant barrier to the recovery of materials in facilities using composting or energy-from-waste processes.

<sup>58</sup> Mobile Phone Industry Recycling Program

<sup>59</sup> AMTA, Mobile Phone Industry Recycling Program collections to June 2003



**Level of community concern about the waste**

The DEC's consultation process demonstrates that there is support for mobile phones and batteries receives priority focus over the next 12 months in order to monitor the implementation of the AMTA scheme, particularly in terms of participation and recovery rates.

**Extent to which EPR is the appropriate tool for managing the waste**

EPR is an appropriate tool for managing mobile phones and batteries. AMTA implemented the Mobile Phone Industry Recycling Program following an initial trial in NSW of battery recycling in early 1999. A levy of 42 cents on each new phone handset and 13 cents for each battery pays for the collection and appropriate disposal of unwanted phones and batteries. The program worked with Planet Ark to launch a national mobile phone recycling program with the aim of recovering one million mobile phones. There are currently over 1800 retail stores participating in the national Mobile Phone Industry Recycling Program.

Developments overseas in relation to EPR schemes for mobile phones and batteries are detailed in Appendix III.

## Fact Sheet: Packaging waste

### Assessment criteria

#### ***Detrimental environmental and/or public health impacts resulting from the recovery and/or disposal of the product***

Packaging materials are produced from a wide range of raw materials, from simple materials such as plantation wood through to complex component materials such as long-life milk containers containing paper, plastic and aluminium. The wide variety of uses and composition of packaging restricts the identification of specific environmental and health impacts.

The major environmental impact is the substantial use of non-renewable resources.

The other significant impact is litter. Packaging from fast food, beverage containers and plastic bags are common litter items. Litter can have a serious impact on wildlife and reduce the visual amenity of urban and rural environments.

#### ***Total volume of waste requiring disposal and/or the percentage of the waste stream it comprises***

Packaging can be made from plastic, glass, paper, cardboard, aluminium, steel, wood or mixtures such as liquidpaperboard used in milk cartons or plastic containers with an aluminium foil layer used for chips.

The quantity of packaging waste disposed of to NSW landfills is difficult to quantify but could be as high as 10% of the Commercial and Industrial (C&I) and Municipal Waste streams.

An estimated 491,744 tonnes of packaging material were collected at kerbside in NSW in 2001–02 (NEPC 2002). This included:

- 269,141 tonnes paper and cardboard (54.7%)
- 165,091 tonnes glass (33.6%)
- 19,958 tonnes HDPE plastic (4.1%)
- 16,671 tonnes steel cans (3.4%)
- 11,350 tonnes PET plastic (2.3%)
- 2859 tonnes aluminium (0.6%)
- 1085 tonnes liquidpaperboard (0.2%)
- 269 tonnes of PVC (0.1%).

Another 5320 tonnes of 'other waste' were collected.

#### ***Potential for waste avoidance, reuse or beneficial resource recovery***

There are resource recovery opportunities for all commonly used packaging materials currently collected through kerbside recycling systems, drop-off centres, commercial operations collecting from businesses and other points, public place recycling, and take-back schemes.

Many commercial operations collect, take away for a fee, or buy used packaging materials. These operations generally take a range of different materials for recycling.

Systems and technologies to reduce, recover and/or reprocess some packaging are well established. For example, the estimated weight of kerbside materials sold and/or sent to secondary uses (including energy recovery) in 2001–02 included:

- 259,859 tonnes paper and cardboard
- 151,281 tonnes glass
- 17,833 tonnes HDPE plastic
- 15,968 tonnes steel cans
- 10,636 tonnes PET plastic
- 2708 tonnes aluminium
- 1069 tonnes liquidpaperboard
- 256 tonnes PVC.

Another 5003 tonnes of 'other waste' collected at kerbside were sold or sent for secondary use.

Materials recycled and sold for secondary use in NSW in 2001–02 totalled about 464,613 tonnes or 216 kg per household per year. This represents 94% of the 491,744 tonnes collected at kerbside in NSW so that almost all material collected is sent to recovery facilities (NEPC 2002).

There has been widespread beverage container collection for recycling in NSW for the last 10 years through kerbside recycling.

Government and industry have both invested in research and development on the impact of packaging materials and the use of alternative materials as part of the National Packaging Covenant.

***Potential to contaminate other waste streams and limit opportunities for resource recovery***

Cross-contamination between packaging materials, such as PVC or metal lids with HDPE or PET plastic, may cause problems depending on the collection/technical system used to separate, recover or recycle the materials.

***Level of community concern about the waste***

There is a high level of community concern about packaging waste. The DEC's consultation process demonstrates that there is support for packaging waste to be given priority focus over the next 12 months to monitor the effectiveness of the National Packaging Covenant and the supporting National Environment Protection Measure (see below).

***Extent to which EPR is the appropriate tool for managing the waste***

EPR is an appropriate tool for managing packaging waste. Packaging waste is being addressed through the National Packaging Covenant, a co-regulatory agreement between industry and government which aims to improve the recovery, reuse and recycling of used domestic packaging materials. The Covenant commenced in August 1999 and is managed by the Covenant Council, which has representatives from the Commonwealth, state/territory and some local governments, and industry.

Businesses who do not join the Covenant are regulated by the states under the National Environment Protection Measure (NEPM) for Used Packaging Materials. In NSW, the *Used Packaging Materials Industry Waste Reduction Plan* enforces the NEPM. It applies to all brand owners with head offices in NSW that are not Covenant signatories and whose packaging forms part of the domestic waste stream. Companies with less than 1% market share in NSW and who sell their products only within the State are exempt from the NEPM.

The DEC represents the NSW Government on the Covenant Council and is a member of the NSW Jurisdictional Recycling Group under the Covenant. The DEC is implementing an Action Plan, which sets out how the Government will meet its Covenant commitments. The current Action Plan runs from July 2003 to June 2004 (Packaging Council of Australia 2003), with priorities including supporting local councils to move towards improved kerbside recycling contracts and systems, increasing markets for both currently collected and emerging materials, and providing sound data to guide continued program development.<sup>60</sup> At 30 June 2003, there were 617 signatories to the Covenant, including 256 from NSW, most of whom are in the food/grocery, health and beauty, packaging manufacturing, hardware, pharmaceutical/chemical and beverage sectors. In the supply chain, they are generally product manufacturers and distributors/retailers. In 2002–03, there were 51 new signatories to the Covenant in NSW, largely as a result of the DEC's advisory and compliance program, which encourages brand owners to participate in the agreement. Those that choose not to join are subject to the mandatory provisions of the NEPM, which requires detailed reporting on the type and quantity of packaging and specifies mandatory recovery rates. It also prevents them from gaining a commercial advantage over signatories.

With the Covenant due to expire in July 2004, a comprehensive evaluation of its effectiveness and that of the NEPM is under way, with input from industry, the Commonwealth, state and local governments, and environment groups. During the review, the DEC drew attention to the need to ensure that the environmental impacts of priority packaging types were being adequately addressed. Stakeholders have suggested that these include polystyrene, polystyrene foam, polypropylene, PVC, stretch film, oil containers and products containing mixed plastics. NSW is keen to ensure that administrative and compliance processes are simple, effective and deliver real environmental outcomes and benefits. The DEC has also funded the Nature Conservation Council to provide the perspective of an environment group on how the Covenant has worked in NSW.

The final report of a review of the Covenant by consultants Nolan-ITU was released in February 2004. It recommended retaining the Covenant with its regulatory safety net for a minimum of three years; improving operational elements of the Covenant/NEPM; and developing nationally consistent and measurable outcomes on the environmental impact of consumer packaging (Nolan-ITU Pty Ltd 2004).

An independent local government evaluation of the Covenant is also being prepared. The full review of the Covenant should be completed by March 2004 and key recommendations submitted to the Environment Protection and Heritage Council meeting in April.

Appendix III reports on EPR developments overseas for packaging waste.

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<sup>60</sup> For more information visit [www.jrqnsw.com.au/reports.html](http://www.jrqnsw.com.au/reports.html)

## Appendix III: What's happening overseas?

The information in this Appendix is not intended to be comprehensive but provides a brief overview of the main EPR and product stewardship initiatives adopted in other countries.

### *Used tyres*

International responses to the management of used tyres include:

- banning the disposal of tyres to landfills
- charging a disposal or recycling fee on new tyres
- legislation requiring tyre producers to collect and recycle used tyres
- financial incentives to encourage research and development (R&D) to improve tyre design and promote end markets for used tyres.

In 1994, **Sweden** introduced an Ordinance requiring tyre producers to collect and recycle waste tyres in accordance with statutory recycling targets. With funds from a levy on the sale of new tyres, the industry formed a non-profit producer responsibility organisation (PRO) to administer the contracts for tyre collection and recycling. According to the PRO, incineration of used tyres has fallen from 70% in 1996 to 40% in 1999. The 60% of tyres not incinerated are being used for various purposes, including retreading, sports arenas and protection during blasting operations. Similar approaches have also been adopted in **The Netherlands, South Korea** and **Finland**.

All **European Union** members will need to find alternatives for used tyres from July 2006 when the EU Landfill Directive (EU 1999) banning the landfilling of virtually all tyres comes into force.

In the **United States**, landfill bans on tyres apply in 33 states and over 30 collect a disposal fee, which helps fund research to improve tyre design and market development (US EPA 2003d). Many used tyres are directed to energy recovery or exported to developing countries for reuse or recycling.

All provinces in **Canada**, with the exception of Newfoundland, have product stewardship programs to deal with used tyres. The provinces charge C\$2–\$4 per tyre sold and used tyres are sent back to dealers to arrange for recycling or energy recovery (Tire Recycling Management Association of Alberta 2002).

**South Africa** is proposing to make tyre recycling compulsory.<sup>61</sup>

### *Computers*

International responses to managing computer waste have been diverse and include:

- banning the use of materials that are problematic during recycling and disposal
- mandatory take-back of computers by manufacturers from consumers
- restricting the disposal of computers to certain types of landfills or energy-from-waste facilities
- simplifying the waste regulatory systems to encourage the recovery and recycling of computers.

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<sup>61</sup> *WARMER Bulletin E-News*, no.20, 21 June 2003

In the **United States**, government, industry and environmental interests are close to finalising a National Electronics Product Stewardship Initiative for a nationwide recovery scheme for obsolete computers, monitors and televisions (National Electronics Product Stewardship Initiative 2002). A front-end recycling fee on new sales will cover the costs of scrap collection, transport and processing. IBM and Hewlett-Packard (2003) have recycling programs, which charge the consumer approximately US\$30 per computer.

Electronics Product Stewardship **Canada** (EPS Canada), a not-for-profit organisation, has been set up by the Information Technology Association of Canada, to coordinate a national action plan for managing information technology (IT) waste. Members include Apple, Brother, Canon, Dell, Epson, Hewlett-Packard, Hitachi, IBM, Lexmark, LG Electronics, Panasonic, Sanyo, Sharp Electronics, Sony, Thomson Multimedia and Toshiba (EPS Canada 2003).

EPS Canada is proposing a uniform national environmental handling charge on each major category of technology product which covers the cost of environmentally responsible disposal. The fee will be shown as a separate charge on the consumer's receipt. Current work by EPS suggests the following handling fees for major products will apply: monitor C\$12, central processing unit C\$8, laptop C\$2, printer C\$7, television C\$25.

Three Canadian provinces have also drafted approaches to the management of waste electronic equipment. In June 2002, **Ontario** passed the Waste Diversion Act, which requires a diversion plan to be created for the designated wastes of electronics. In **Manitoba**, the Hazardous or Prescribed Household Waste Stewardship Regulation proposes the inclusion of such waste, as does the **Québec** Waste Action Plan.

In June 2001, the European Council approved a directive requiring manufacturers of electronic equipment to pay for the recycling of their products (EU 2002). The European Parliament in October 2002 agreed on two directives on electrical equipment which have since become operational. The European Union *Waste Electrical and Electronic Equipment Directive* promotes electrical products that are designed for easy repair, upgrade, reuse and dismantling, and safer recycling (EU 2002b). It requires all member states to achieve by 31 December 2006 a minimum recovery rate 4 kilograms per individual per year. The EU *Restriction of Hazardous Substances in Electrical and Electronic Equipment Directive* bans the use of lead, mercury, cadmium, polybrominated biphenyls (PBB) and polybrominated diphenyl ethers (PBDE) in electrical equipment from 1 July 2006 (EU 2002a).

A number of European countries have been drafting their own policies.

**Sweden**, as long ago as 1970, began developing policies that recognised the importance of manufacturer and product developer involvement. Its most recent example is the *Directive on Waste from Electrical and Electronic Equipment*, which came into force in July 2001. This producer responsibility ordinance requires dealers and manufacturers of electrical and electronic equipment to take back free of charge a piece of old equipment when the customer buys a new equivalent product. Producers are expected to finance their part of the take-back system through a fee on new products.

In **Norway**, a nationwide system for recycling of both electric and electronic product waste, as well as decommissioned machines, is in operation. The scheme is financed through an environmental fee, which is added to electrical and electronic products at the point of sale.

In **The Netherlands**, the *Disposal of White and Brown Goods Decree* places almost full responsibility for take-back on the manufacturers and importers of electronic products. The legislation allows industry to impose a surcharge on the price of new products to help fund take-back schemes. A collection and disposal system for waste electrical and electronic equipment has been set up by the electronics industry.

In **Switzerland**, the *Ordinance on the Return, the Taking Back and the Disposal of Electrical and Electronic Appliances* obliges retailers and manufacturers to take back old equipment. In

December 2002, the Swiss Government announced a partnership with the mobile phone industry to work together on the management of the waste.

In **Germany**, the *Waste Appliances Ordinance* for the take-back and recycling of waste from electrical products is currently being developed (Federal Ministry for Environment, Nature Conservation and Nuclear Safety 2002).

In **Japan**, the Ministry of Economy, Trade and Industry and the Ministry of Environment have been working jointly with other ministries and agencies to develop legislative approaches to manage waste from electronic equipment. There are two key pieces of legislation: the Law for Recycling Specific Kinds of Home Appliances (enacted in 1999) requiring consumers to pay manufacturers a fee to recycle discarded appliances, including televisions, air-conditioners, refrigerators and computers (Ministry of Economy, Trade and Industry 1999); and the Law for the Promotion of Effective Utilisation of Resources, which requires manufacturers, retailers, municipalities and consumers to play a more active role in sorting, collecting, processing and recycling such wastes (AEEMA, EcoRecycle Victoria & CESA 2003).

### *Televisions*

International responses to managing waste from televisions include:

- banning the use of some materials that are problematic during recycling and disposal (see 'Computers' above)
- mandatory take-back of televisions and electrical equipment by manufacturers from consumers (see 'Computers' above)
- restricting the disposal of televisions and entertainment equipment to certain types of landfills or energy-from-waste facilities.

Industry has developed new technologies and designs to minimise the levels of hazardous components within televisions. This includes finding suitable alternatives to lead solder and introducing flat screen monitors that do not use cathode ray tubes (AEEMA, EcoRecycle Victoria & CESA 2003). However, some flat panel screens contain mercury, which can form organic compounds that damage the developing nervous system.<sup>62</sup> Other design initiatives include strategies to improve the disassembly of televisions and to label plastics for recycling (US EPA 2003b).

### *Nickel cadmium batteries, excluding mobile phone batteries*

Most European and North American countries have comprehensive waste regulatory schemes for batteries involving generator and transport tracking, advance deposits or disposal fees.

To encourage the recovery of batteries, some countries, such as the **United States**, have implemented specific legislation requiring battery recycling and labelling (US EPA 2002). This legislation includes the requirement to design equipment that allows electrical power batteries to be removed during disassembly.

New battery chemistries based on lithium have been developed which have lower impacts on the environment during recycling or disposal to landfills. Changes in design to facilitate disassembly of items and the production of disassembly guides are other measures adopted by industry.

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<sup>62</sup> The hazardous characteristics of waste electrical and electronic equipment, including the risks associated with landfilling and recycling, have been well documented in Europe. See Commission of European Communities (2000).

The disposal of NiCad batteries in municipal waste has been banned in some countries, such as **Switzerland** (Swiss Agency for the Environment, Forests and Landscape 2003) where there is advanced municipal waste disposal processing by either biological methods or energy-from-waste. The **European Union** proposes to complete an *Extended Impact Assessment of the Battery Directive* in late 2003 (EU 1991). Proposals for updating the Directive currently under consideration include requests that member states establish systems for the separate collection of batteries that contain certain quantities of heavy metals, such as mercury, lead and cadmium.

### *Agricultural/veterinary chemicals*

In the **United States**, the Product Stewardship Institute, a non-government organisation allied to the University of Massachusetts, proposes a nationwide chemical collection program, to be funded by industry.<sup>63</sup> However, the action plan shows no evidence of being embraced by the US Environmental Protection Agency (EPA), agriculture agencies or industry bodies.

In 2001, the **United Kingdom** Environment Agency announced plans to develop a policy to manage a range of non-natural farm wastes, including agricultural/veterinary chemicals, with the focus on animal health products (UK Environment Agency 2003). Developments to date have been limited.

Following a major review of its chemicals management framework, the **European Union** released the *White Paper on Chemicals Policy* in 2001 (EU 2001). This proposes the Registration, Evaluation and Authorisation of Chemicals (REACH) system, where a uniform system will be used to grade chemicals by category and volume. The planned changes will ban chemicals that industry cannot demonstrate are safe to be used. So far REACH has proposed that all chemical manufacturers provide detailed information about potential chemical hazards on the labels of their products. However, at this stage, it is not clear what impact the introduction of REACH will have on the use of agricultural/veterinary chemicals in EU member states.

### *Agricultural/veterinary chemical containers*

International responses include the provision of information on disposing of pesticide containers safely. In the **United States**, the US EPA has negotiated with industry a new standard that requires all pesticides to be labelled with instructions about safe disposal techniques (US EPA 2003c). **Canada** has been running a pesticide container recycling scheme since 1989, which collected and recycled nearly 4.7 million pesticide containers in 2000, and claims to have achieved a recovery rate of 68% (Canadian Phytopathological Society 2001)

### *Mobile phones and batteries*

International responses have included banning disposal of mobile phones and batteries to landfills or energy-from-waste facilities (**United States, Switzerland, Germany, Japan, Korea and Taiwan**<sup>64</sup>) and introducing specific recycling and labelling schemes (**United States**).

In December 2002, ten of the world's largest mobile phone manufacturers agreed to work with the United Nations Environment Program to develop a global waste management plan

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<sup>63</sup> Details at [www.productstewardshipinstitute.org/](http://www.productstewardshipinstitute.org/)

<sup>64</sup> A good overview is provided in OECD (2001). See also conference proceedings from the *International Congress for Recycling Batteries* held 18–20 June 2003 in Lugano Switzerland; details at International Congress and Marketing website [www.icm.ch/](http://www.icm.ch/)



with programs for collecting end-of-life phones. Producers are urging phone network providers to share in the establishment of recovery systems (UNEP 2002).

### *Packaging waste*

EPR for packaging waste in **Germany** began in 1991 with the Duales System Deutschland or Green Dot System and the German Packaging Ordinance. This labelling scheme allows industry to impose fees on packaging materials. Under the system, product manufacturers pay an industry-created body to place a green dot on their packages. This represents a 'recycling guarantee'. Commercial licensing fees are paid by companies to the producer organisations to fund the collection and recycling of packaging waste throughout Germany. Where industry fails to achieve the set targets, a government-prescribed program is put in place.

The Green Dot System is now used by other countries including **Austria, Belgium, France, Greece, Ireland, Luxembourg, Portugal, Spain, Sweden, Norway, Hungary, Latvia, Czech Republic and Poland.**

**England and Wales** have introduced a tradeable certificate program to manage packaging waste, which is governed by the Producer Responsibility Obligations (Packaging Waste) Regulation 1997. The Regulation requires obligated businesses (including raw material suppliers, packaging manufacturers and 'fillers', retailers and importers) to recover specified tonnages of packaging waste, in line with mandatory EU resource recovery targets. These businesses must purchase a specified number of packaging waste recovery certificates from accredited recyclers to prove that they have met their recovery and recycling obligations. Where businesses reduce their packaging use or reuse packaging, their obligation to purchase certificates is reduced. Businesses may also choose to join a collective organisation (termed a 'compliance scheme' in the UK) that will manage their responsibilities for an annual fee. A large majority of certificate sales are covered by contracts between recyclers and compliance schemes. Businesses and recyclers report annually to the program administrator, the UK Environment Agency.

**California** has recycled content laws for glass, plastic garbage bags and rigid plastic containers. In particular, the US State requires industry to maintain an overall 25% aggregate recycling rate for rigid plastic containers or individual brand owners will face a variety of alternative requirements, including a mandated 25% post-consumer recycled content. California has expanded its bottle bill to cover non-carbonated waters, teas and juices, adding an estimated 2 billion containers to the soft drink and beer containers that have traditionally been covered by bottle bills.

In 2000, **Japan** introduced a packaging waste law requiring municipalities to collect, sort and wash waste packaging. Packaging manufacturers and users of packaging must then take back and recycle the processed waste from municipalities. The system has largely resulted in third-party PROs taking financial responsibility for recycling packaging waste and passing this cost on to consumers in the product price. Since 1997, PET bottles and cans have been subject to mandatory recycling.

### *Plastic bags*

The European Union Packaging Directive, while not specifically targeting plastic bags, does set recovery and recycling targets for plastic packaging. Most member countries (**Austria, Belgium, Finland, France, Germany, Italy, Luxembourg, Portugal, Spain, Sweden**) have developed EPR mechanisms to implement the Directive. Sections of the packaging industry make payments to designated bodies that are responsible for arranging the collection, separation, recycling and recovery of specific packaging material. Some member countries only make plastic bags available upon request from consumers in strong reusable form at a cost of between \$0.50 and \$1.00 each.

**Denmark** has had a tax on plastic and paper carrier bags since 1994 as part of a range of 'green' taxes. The tax on shopping bags aimed to promote the use of reusable textile bags and it has reduced consumption of plastic and paper by 66%. However, it is not a transparent charge to the consumer and thus the impact on consumer behaviour has been less dramatic than in **Ireland**.

The retail chain Sainsburys in the **United Kingdom** has implemented a 'penny back' scheme for the reuse of carry bags and the 'bag for life' scheme where customers pay 10 p for a reusable strong plastic carry bag that can be returned to the store when it is worn out and replaced for free. The original bag is then recycled. Another UK supermarket chain, Co-op, is replacing lightweight plastic bags with biodegradable plastic bags in addition to its 'bag for life' initiatives. The biodegradable bags degrade completely in three years compared with over 100 years for non-degradable bags.

**Ireland** introduced a levy of 0.15 Euros for plastic bags in March 2002, which led to a reported reduction of 90%–95% in the number of plastic bags used. Prior to this, an estimated 1.2 billion bags (or 300 per person per year on average) had been distributed free by shops in 2001.

In **South Africa**, a new regulation was enacted in May 2003 which prohibits the manufacture, trade and commercial distribution in all retail stores of thin plastic bags (those under 30 microns in thickness). There are significant penalties for non-compliance. The cost of providing alternative thicker bags is being passed on to the consumer, but this cost is effectively reduced when they reuse the bags.

In some parts of **India**, manufacturers and distributors of plastic bags are prohibited from generating or supplying bags less than 20 microns thick.

The **Bangladesh** Government introduced legislation in January 2002 to ban the use of polythene plastic bags in the capital Dhaka. Serious flooding (and subsequent loss of life) has resulted from plastic bags blocking drains and there is strong pressure to extend the ban to other large cities in the country.

### *Cigarette butts*

There are only a few examples of tobacco companies taking responsibility for the litter resulting from their product. One **United States** company (Philip Morris USA 2003) believes it has a role to play in reducing cigarette litter and is:

- communicating with smokers and website users that cigarette filters are litter
- working with litter reduction organisations to increase awareness of litter and encourage smokers to stop littering
- developing model programs and sharing best practices with other groups who are reducing cigarette litter, such as Keep America Beautiful (2003) and the Ocean Conservancy.

### *Electrical products, excluding computers, televisions and mobile phones*

International responses to managing waste from these products include:

- banning the use of materials that are problematic during recycling and disposal (**European Union, California, Germany**)
- mandatory take-back of major home appliances by manufacturers from consumers (**United States, Canada, Norway, Switzerland, Sweden, The Netherlands, Japan**)
- remanufacturing schemes for components (**United States**).

The 'Computers' section in this Appendix has information on two **European Union** directives to manage waste from electrical products and recycling laws in **Japan**.

The US EPA Resource Conservation Challenge, introduced in September 2002, seeks to increase the national recycling rate for electrical products to 35% and cut the production of 30 harmful chemicals by 2005. Under the *Plug-n to recycling campaign*, the US EPA will work with electronics manufacturers, retailers, recyclers and government agencies to reduce the environmental impacts of electronic products during their production, use and disposal (US EPA 2003a).

### *End-of-life vehicle residuals*

The **European Union End-of-life Vehicles Directive** makes manufacturers responsible for taking back and scrapping all new cars sold after 1 July 2002 at the end of their life. From January 2007, they will be required to take back *all* existing cars at the end of their life. The Directive also calls for 85% by weight of a car to be recycled and reused by 2005, and 95% by 2015. This should help address the lack of markets for recycled residual products as incentives will be created for the car manufacturing industry to find markets for secondary products, including increased use of recycled end-of-life vehicle materials in new vehicles (EU 2004).

In **Italy**, the Fiat motor company coordinates the enhanced recovery of materials from nearly 300,000 vehicles per year. This includes glass, which is separated from laminate and other contaminating materials for use in the manufacture of coloured glass containers (Fiat 2004).

Renault has implemented a life-cycle environmental management program that includes increasing the use of recycled materials and the life of consumables. The Renault distribution network provides facilities for collecting used car parts from private owners for recycling (Renault 2003).

Ford has issued worldwide automotive recycling guidelines to its suppliers and engineers, which include internal recyclability and recovery goals for new products and objectives for the use of recycled material. Ford's Model U prototype uses environmentally friendly materials such as a canvas roof made from corn and seat foam made from soy beans (Ford 2004).

Toyota Motor Corporation in **Japan** plans to use a newly developed plastic made from plants to produce automotive parts and reduce emissions of the greenhouse gas carbon dioxide during manufacture.

In **Taiwan**, the Waste Motor Vehicles Recycle and Disposal Regulations make manufacturers responsible for retrieving the end-of-life vehicles they originally produced.

### *Household hazardous waste*

In the Canadian province of **British Columbia**, the Government has introduced mandatory product stewardship schemes for the management of household hazardous wastes (HHW). For example, the Paint and Product Care Association (formed by brand owners of consumer paint products) operates a provincial network of paint collection depots and manages leftover paint in an environmentally responsible manner.

In the **United States**, it is estimated that 1.6 million tons of HHW are generated each year and there are over 3000 HHW programs and collections (US EPA 1993). In **California**, it is illegal to dispose of HHW in domestic rubbish, down stormwater drains or on the ground. Some states, such as **Illinois**, have made it illegal to dispose of neon lamps to landfill or incinerators.

Collection of HHW in specially designed vans is widespread in **Germany, The Netherlands, France and Switzerland**. Drop-off collection parks are also used to collect HHW. In **Denmark**, paints and batteries can be disposed of at recycling parks, paint dealers have agreed to take back unused paints and pharmacies take back unused medicines. Batteries can be disposed of in all places where they are sold.

Programs operating since 1993 in Flanders, **Belgium**, collect paint, inks, glues, oils, resins, grease, solvents, acids, cleaning products, bases, batteries, items containing mercury and packaging with HHW residue. Material is collected in 50-litre containers with child-proof locks that must be handed to collectors and not left unattended. Material is sorted by collection crews on the van and re-sorted at transfer stations. Some HHW, such as paints, oils and solvents, may be bulked up. Fifty percent of the material recovered is used motor and cooking oil. Paint accounts for 16% of the total. Motor oil, cooking oil, fluorescent light bulbs, x-rays, car batteries, mercury oxide and NiCad batteries, non-toxic aerosols, silver and some solvents are recycled. Thirty-five percent of HHW is treated physically or chemically before being destroyed in incinerators. The costs of recovering HHW is believed to be justified.

The EU has not yet developed regulations requiring separate HHW collection but a report in July 2002 recommended the introduction of separate HHW collection for 14 identified substances (EU 2002c).

### *Office paper*

In some countries, governments are using their purchasing power to stimulate markets by setting minimum requirements for recycled content in paper purchased by authorities. They are also using pricing policies, such as setting aside a minimum amount of the procurement budget for buying recycled content items or subsidising prices.

Manufacturers are becoming more active in specifying the percentage of recycled content of papers and the level that is sourced from post-consumer activities. One mill in the **United Kingdom** sells recycled paper made from office paper collected locally.

In **Germany**, private households, trade and industry are now required to sort their paper waste under the recently amended Ordinance on the Management of Municipal Wastes of Commercial Origin and Certain Construction and Demolition Wastes. Waste may be collected unsorted and passed to a pre-treatment plant for processing, which now has a recovery quota of 85%. Germany has notified the European Commission of its intention to push for similar provisions at EU level.

### *Polyvinyl chloride (PVC)*

**Belgium** introduced an eco-tax to shift consumption away from PVC. In **The Netherlands**, Packaging Covenant (*Stichting Verpakking en Milieu*, 1991) bans the use of PVC in packaging (OECD 1998).

In **Japan**, concerns about dioxin from garbage incineration led the Government to enact a new container and wrapping materials law requiring producers of PVC to recycle waste products from the year 2000.

In the **United States**, the vinyl industry has sponsored a number of pilot programs to test the practicality of sorting technology. These programs include technology development at the Center for Plastics Recycling Research, Rutgers University; a pilot drop-off program conducted with the city of Nashville; and technology and equipment testing with a number of waste management companies.

An environmentally friendly, low-cost alternative to PVC and acrylic plastics has been developed in **Germany**. The plastisols can be used in corrosion-resistant coatings for metal

parts such as building frameworks and vehicle underbodies, or for containers used in the food industry.<sup>65</sup>

### *Treated timber*

Some countries have banned the use of certain types of treatments particularly when wood is recovered for use in energy-from-waste processes. Following a risk assessment, the **European Union** issued a directive in January 2003 restricting the marketing and use of wood preservatives containing arsenic after 30 June 2004 (Commission of European Communities 2003). Wood treated with arsenic, particularly copper-chrome-arsenate (CCA), was found to be a major pollutant in solid waste. The directive states that treated wood may not be used in residential or domestic construction, anywhere there is a risk of repeated skin contact, in marine waters, for agriculture (other than fence posts) or industry where products for human or animal consumption may come into contact with the timber.

The EU also restricted the use of creosote in October 2001, banning it above a certain concentration inside buildings, in toys, playgrounds, parks, garden furniture and industrial uses where products for human or animal consumption may come into contact with the timber.

The **United States** wood preservation industry voluntarily agreed to move consumer use of treated lumber products away from a variety of pressure-treated wood that contains arsenic in favour of new alternative wood preservatives by 31 December 2003. From January 2004, the US EPA is not allowing CCA-treated products for most residential uses, including wood intended for play structures, decks, picnic tables, landscaping timbers, gazebos, residential fencing and patios. The US EPA is awaiting the outcomes of its joint study on CCA with the Consumer Products Safety Commission.

After December 2003, wood preservers in **Canada** will no longer treat wood with CCA for non-industrial applications.

**New Zealand** recently conducted a risk assessment of CCA-treated timber, determining that while CCA use will not be restricted at this stage, further investigations may be undertaken (ERMA 2003).

### *Whitegoods residuals*

In some European countries, the metal shredding operation is undertaken under vacuum so that ozone-depleting chemicals can be recovered. Strategies to de-gas and disassemble the motors, other valuable parts and the plastic components could be adopted by the Australian industry.

International responses to managing whitegoods residuals include:

- banning the use of some materials that are problematic during recycling and disposal (**European Union, California, Germany**)
- mandatory take-back of major home appliances by manufacturers from consumers (**United States, Canada, Norway, Switzerland, Sweden, The Netherlands, Japan**)
- remanufacturing schemes for components (USA).

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<sup>65</sup> More at [www.fraunhofer.de/researchnews](http://www.fraunhofer.de/researchnews)

## Glossary

**Cleaner production** is a process for improving the economic efficiency and reducing environmental impacts across the entire life cycle of a product or service. In production processes, it typically involves reducing the use of resources, including raw materials, energy and water (and eliminating the use of toxic raw materials), and reducing the quantity and toxicity of all emissions and waste.

**Contamination** is any introduction of micro-organisms, chemicals, wastes, or wastewater into the environment or a product in a concentration that makes the environment or the product unfit for its intended use. Contaminants can have a detrimental impact on the quality of recycled materials and can decrease the potential for resource recovery.

**Energy-from-waste** technologies can convert materials such as compostable organics, tyres, plastics, clinical and related wastes into heat and electricity using a number of processes, including combustion, gasification and pyrolysis.

An **extended producer responsibility scheme** is defined in section 15 of the *Waste Avoidance and Resource Recovery Act 2001* as a scheme for giving effect to an environmental policy in which the producer's responsibility for a product, including physical and financial responsibility, is extended to the post-consumer stage of the product's life cycle. Any such scheme includes a scheme for product stewardship (see below).

**Producer** is defined in section 15 of the *Waste Avoidance and Resource Recovery Act 2001* to include a supplier of the product in this State or person having a proprietary interest in the name under which the product is supplied in this State.

**Product** is defined in section 15 of the *Waste Avoidance and Resource Recovery Act 2001* to include any substance.

**Product stewardship** is defined in section 15 of the *Waste Avoidance and Resource Recovery Act 2001* as shared responsibility for the life cycle of products, including the environmental impact of the product from the extraction of virgin materials, to manufacturing to consumption and through to and including ultimate disposal and post-disposal consequences.

## References

- ABS 1999, *Motor Vehicle Census*, Australian Bureau of Statistics
- ABS 2002, *9309.0 Motor Vehicle Census*, Australian Bureau of Statistics, November
- ACOR 2003, *ACOR Recycling Brief*, issue 9, Australian Council of Recyclers
- AEEMA, EcoRecycle Victoria & CESA 2003, *Beyond the Dead TV: Managing End-of-life Consumer Electronics in Victoria – A Pilot Product Stewardship Project*, May; available at [www.ecorecycle.vic.gov.au/asset/1/upload/BeyondTV\\_v3.pdf](http://www.ecorecycle.vic.gov.au/asset/1/upload/BeyondTV_v3.pdf)
- AMTA 2003a, *Mobile Phone Industry Recycling Program Frequently Asked Questions*, Australian Mobile Telecommunications Association
- AMTA 2003b, *Product Stewardship Policy Statement*, Australian Mobile Telecommunications Association
- ANZECC 2000, *Review of Industry Waste Reduction Scheme for Crop Protection and Animal Health Product Containers and drumMUSTER*, Australian and New Zealand Environment and Conservation Council, December
- APVMA 2003a, *Arsenic Based Timber Treatments: Frequently Asked Questions*, Australian Pesticides and Veterinary Medicines Authority; available at [www.apvma.gov.au/chemrev/arsenic\\_faq.shtml](http://www.apvma.gov.au/chemrev/arsenic_faq.shtml)
- APVMA 2003b, 'Copper Chrome Arsenate (CCA): APVMA puts industry on notice', Australian Pesticides and Veterinary Medicines Authority, 28 July; available at [www.apvma.gov.au/media/mr0306.shtml](http://www.apvma.gov.au/media/mr0306.shtml)
- APVMA 2003c, *The Reconsideration of Registrations of Arsenic Timber Treated Products (CCA and Arsenic Trioxide) and their Associated Labels: Review Summary, Draft for Public Discussion*, Australian Pesticides and Veterinary Medicines Authority, December
- Australian Academy of Technological Sciences and Engineering 2002, *Pesticide Use in Australia*
- Australian Information Industry Association 2002, *Designing for the Environment*, November
- Australian Paint Manufacturers' Federation 2003, *Australian Paint and Ink Industry Annual Report 2003*
- Avcare 2003, *Industry Environment Report 2002*
- BATA 2002, *Scoping Paper for the Butt Littering Trust: An Initiative to Reduce Cigarette Butt Litter in Australia*, prepared by Nolan-ITU Pty Ltd for British American Tobacco Australia Ltd, December
- Beverage Industry Environment Council & Community Change 2001, *Littering Behaviour Study III: Measuring Environmentally Desirable Change in Australia*
- Canadian Phytopathological Society 2001, *Canada Leads world in recycling of crop chemical containers* [www.cps-scp.ca/cropprotection.htm](http://www.cps-scp.ca/cropprotection.htm) (accessed 18 June 2003)
- Centre for Environmental Solutions 2002, *Impacts of Implementing Container Deposit Legislation in the ACT*, August; available at [www.c4es.com.au/publications.asp](http://www.c4es.com.au/publications.asp)
- Clean-Up Australia 2004a, *Cigarette Butts*; available at [www.cleanup.com.au/Main.asp?RequestType=Doc&DocID=80&CatID=116](http://www.cleanup.com.au/Main.asp?RequestType=Doc&DocID=80&CatID=116) (accessed 24 March 2004)
- Clean-Up Australia 2004b, *Say no to plastic bags*; available at [www.cleanup.com.au/main.asp?RequestType=Doc&DocID=118&CatID=61](http://www.cleanup.com.au/main.asp?RequestType=Doc&DocID=118&CatID=61) (accessed 29 March 2004)

Commission of European Communities 2000, *Proposal for Directive of European Parliament and of the Council on Waste Electrical and Electronic Equipment on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment*; available at [europa.eu.int/eur-lex/en/com/pdf/2000/en\\_500PC0347\\_02.pdf](http://europa.eu.int/eur-lex/en/com/pdf/2000/en_500PC0347_02.pdf) (accessed 26 March 2004)

Commission of European Communities 2003, *Commission Directive 2003/02/EC Relating to Restrictions on the Marketing and Use of Arsenic*, 6 January

CSIRO 1996, *The Environmental Aspects of the Use of PVC in Building Products*

CSIRO 1998, *The Environmental Aspects of the Use of PVC in Building Products*, second edition

CSIRO 2001, *A Discussion of Some of the Scientific Issues Concerning the Use of PVC*

DEH 2003a, *Electrical and Electronic Product Stewardship Strategy*, Department of the Environment and Heritage, Canberra; available at [www.deh.gov.au/industry/waste/electricals/](http://www.deh.gov.au/industry/waste/electricals/)

DEH 2003b, *End-of-life Environmental Issues with PVC in Australia*, Department of the Environment and Heritage, Canberra

DEH 2003c, 'Kemp acts to reduce impact of plastic bags and other debris on marine wildlife', media release, 13 August; available at [www.deh.gov.au/minister/env/2003/mr13aug03.html](http://www.deh.gov.au/minister/env/2003/mr13aug03.html)

DEH & DEC in press, *Electrical and Electronics Products Infrastructure Facilitation*, prepared for (Cwlth) Department of the Environment and Heritage and (NSW) Department of Environment and Conservation by Nolan-ITU Pty Ltd in association with Centre for Design, RMIT and Product Ecology Pty Ltd

Environment Australia 2001a, *Computer and Peripherals Material Project*, consulting report prepared by Meinhardt Infrastructure and Environment Group, Canberra, October

Environment Australia 2001b, *Major Appliances Materials Project*, Canberra; available at [www.deh.gov.au/industry/waste/electricals/pubs/majorapplreport.pdf](http://www.deh.gov.au/industry/waste/electricals/pubs/majorapplreport.pdf)

Environment Australia 2002, *Plastic Shopping Bags: Analysis of Levies and Environmental Impact Final Report*, report prepared by Nolan-ITU Pty Ltd, December

Environment Australia 2003, *Analysis of Trade in Used Lead-acid Batteries Between Australia and New Zealand*, unpublished

Environment Australia, AEEMA & CESA 2001, *Developing a Product Stewardship Strategy for Electrical and Electronic Appliances in Australia*, March

EPA 2000, *NSW Government Waste Reduction and Purchasing Policy*, Environment Protection Authority, Sydney

EPA 2001a, *A Review of the Toxicity of Tyre Leachate in the Environment with an Assessment of the Necessity for Further Research and Recommendations for Further Research*, Environment Protection Authority, Sydney, November, unpublished

EPA 2001b, *Draft Issues Paper: Gas Cylinders – End-of-life Concerns*, Environment Protection Authority, unpublished

EPA 2003a, *Environmental Compliance Reports: Wood Preservation – Part A Compliance Audit and Part B Review of Best Practice and Regulation*, Environment Protection Authority, Sydney

EPA 2003b, *Trends in Nickel Cadmium Battery Consumption and Recovery*, report prepared by Nolan-ITU Pty Ltd for Environment Protection Authority, August, unpublished

EPA Victoria 2003, *Policy Background Paper: Container Deposit Legislation – Financial Impacts*, Environment Protection Authority, Melbourne



EPHC 2002, *A National Approach to Waste Tyres: Policy Discussion Paper*, Environment Protection and Heritage Council, Canberra

EPHC 2003, 'Water, air, waste top Ministers' agenda', Environment Protection and Heritage Council communique, 23 May; available at [www.ephc.gov.au/pdf/EPHC/Comm\\_23\\_5\\_03.pdf](http://www.ephc.gov.au/pdf/EPHC/Comm_23_5_03.pdf)

EPS Canada 2003, *Business Plan*, Electronics Product Stewardship Canada; available at [www.epsc.ca/pdfs/EPS\\_Canada\\_BusinessPlan.pdf](http://www.epsc.ca/pdfs/EPS_Canada_BusinessPlan.pdf) (accessed 30 April 2003)

ERMA 2003, *ERMA New Zealand CCA Study Release Update*, Environmental Risk Management Authority of New Zealand; available at [www.ermanz.govt.nz/news-events/archives/media-releases/2003/mr-20030502.asp](http://www.ermanz.govt.nz/news-events/archives/media-releases/2003/mr-20030502.asp) (accessed 18 July 2003)

EU 1991, *Directive 1991/157/EEC on Batteries and Accumulators Containing Dangerous Substances*, European Union; available at [europa.eu.int/comm/environment/waste/batteries](http://europa.eu.int/comm/environment/waste/batteries) (accessed 26 March 2004)

EU 1999, *Directive 1999/31/EC on the Landfill of Waste*, European Union; available at [europa.eu.int/scadplus/leg/en/lvb/l21208.htm](http://europa.eu.int/scadplus/leg/en/lvb/l21208.htm)

EU 2001, *White Paper Strategy for a Future Chemicals Policy*, European Union; available at [www.europa.eu.int/comm/environment/chemicals/0188\\_en.pdf](http://www.europa.eu.int/comm/environment/chemicals/0188_en.pdf)

EU 2002a, *Directive 2002/95/EC of the European Parliament and of the Council on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment*, European Union; available at [www.europa.eu.int/comm/environment/waste/weee\\_index.htm](http://www.europa.eu.int/comm/environment/waste/weee_index.htm) (accessed 26 March 2004)

EU 2002b, *Directive 2002/96/EC of the European Parliament and of the Council on Waste Electrical and Electronic Equipment*, European Union; available at [www.europa.eu.int/comm/environment/waste/weee\\_index.htm](http://www.europa.eu.int/comm/environment/waste/weee_index.htm) (accessed 26 March 2004)

EU 2002c, *Study on Hazardous Household Waste with a Main Emphasis on Hazardous Chemical*, European Union; available at [europa.eu.int/comm/environment/waste/studies/household.htm](http://europa.eu.int/comm/environment/waste/studies/household.htm) (accessed 26 March 2004)

EU 2004, *End of Life Vehicles*, European Union; available at [europa.eu.int/comm/environment/waste/elv\\_index.htm](http://europa.eu.int/comm/environment/waste/elv_index.htm) (accessed 22 March 2004)

Federal Ministry for Environment, Nature Conservation and Nuclear Safety 2002, *Electronic Waste*; available at [www.bmu.de/en/1024/js/topics/waste/base/?id=1051&nav\\_id=11298&page=1](http://www.bmu.de/en/1024/js/topics/waste/base/?id=1051&nav_id=11298&page=1) (accessed 30 April 2003)

Fiat 2004, *New Mobility*; available at [www.newmobility.fiatauto.com/eng/index.htm](http://www.newmobility.fiatauto.com/eng/index.htm) (accessed 20 March 2004)

Ford 2004, *Green Materials*; available at [www.ford.com/en/innovation/vehicleFeatures/greenMaterials.htm](http://www.ford.com/en/innovation/vehicleFeatures/greenMaterials.htm) (accessed 22 March 2004)

Hewlett-Packard 2003, *Planet Partners™ Product Recycling Program*; available at [www.hp.com/hpinfo/globalcitizenship/environment/recycle/index.html](http://www.hp.com/hpinfo/globalcitizenship/environment/recycle/index.html) (accessed 13 December 2003)

Keep America Beautiful 2003, *Cigarette Litter Facts*; available at [www.kab.org/littercigs.htm](http://www.kab.org/littercigs.htm) (accessed 20 June 2003)

Ministry of Economy, Trade and Industry (Japan) 1999, *Policy Information*; available at [www.meti.go.jp/english/information/data/cReHAppre.html](http://www.meti.go.jp/english/information/data/cReHAppre.html) (accessed 15 July 2003)

MMA/BDA Group 2003, *Report to Environment Australia: A Tradeable Certificate System for Used Oil*, June

National Electronics Product Stewardship Initiative 2002, 'Dialogue achieves milestone: stakeholders agree to financing approach for management of used electronics', media release 19 March; available at [eerc.ra.utk.edu/clean/nepsi/pdfs/nepsipress3-19.pdf](http://eerc.ra.utk.edu/clean/nepsi/pdfs/nepsipress3-19.pdf) (accessed 13 December 2003)

NEPC 2002, *Annual Report 2001–02*, National Environment Protection Council, available at [www.ephc.gov.au/nepc/annual\\_reports.html](http://www.ephc.gov.au/nepc/annual_reports.html)

Nolan-ITU Pty Ltd 2004, *National Packaging Covenant Council: Evaluation of the Covenant*, vols I–III, January; available at [www.deh.gov.au/industry/waste/covenant/evaluation](http://www.deh.gov.au/industry/waste/covenant/evaluation)

OECD 1998, *Extended Producer Responsibility Phase 2: Case Study on Dutch Packaging Covenant*, Organisation for Economic Cooperation and Development, Paris

OECD 2001, *Extended Producer Responsibility: A Guidance Manual for Governments*, Organisation for Economic Cooperation and Development, Paris

Packaging Council of Australia 2003, *NSW Action Plan for National Packaging Covenant*; available at [www.packcoun.com.au/ActionPlans/Govt/ap\\_Govt\\_NSW\\_Y1P.doc](http://www.packcoun.com.au/ActionPlans/Govt/ap_Govt_NSW_Y1P.doc) (accessed 25 July 2003)

Phillip Morris USA 2003, *Policies, Practices and Positions*; available at [www.philipmorrisusa.com/policies\\_practices/litter.asp](http://www.philipmorrisusa.com/policies_practices/litter.asp) (accessed 20 June 2003)

Publishers National Environment Bureau 2002, *ANZECC Industry Waste Reduction Agreement Newsprint 2001–05: Report on Year 2 to 31 December 2002 – Recovered Publication Paper Used in Printing Newspapers*; available at [www.pneb.com.au/pdf/newspaper\\_recycling\\_2002.pdf](http://www.pneb.com.au/pdf/newspaper_recycling_2002.pdf) (accessed 25 July 2003)

Renault 2003, *Vehicle Recycling*; available at [www.sustainability.renault.com/d/d8.htm](http://www.sustainability.renault.com/d/d8.htm) (accessed 22 June 2003)

Resource NSW 2002a, *Construction and Demolition Recycling Directory*, Sydney metro 2nd edition, Sydney

Resource NSW 2002b, *Know Your Paper: A Guide to Purchasing Recycled Content Office Paper*, Sydney

Resource NSW 2002c, *Waste Reduction and Recycling in Office Buildings Fact Sheet*, Sydney

Resource NSW 2002d, *Waste Reduction in Office Buildings: A Guide for Building Managers*, Sydney

Resource NSW 2003a, *NSW Waste Avoidance and Resource Recovery Strategy 2003*, Sydney

Resource NSW 2003b, *Specification for the Supply of Recycled Material for Pavements, Earthworks and Drainage*, issue no.2, Sydney

Swiss Agency for the Environment, Forests and Landscape 2003, *A Guide to Waste – Batteries and Accumulators*; available at [www.umwelt-schweiz.ch/buwal/eng/fachgebiete/fg\\_abfall/abfallwegweiser/batterien/index.html](http://www.umwelt-schweiz.ch/buwal/eng/fachgebiete/fg_abfall/abfallwegweiser/batterien/index.html) (accessed 18 June 2003)

Tire Recycling Management Association of Alberta 2002, *Scrap Tire Plan*; available at [www.trma.com/admin/dynamicpage/default.cfm?PageId=133](http://www.trma.com/admin/dynamicpage/default.cfm?PageId=133) (accessed 13 June 2003)

UK Environment Agency 2003, *Agriculture Controlled Waste*; available at [www.environment-agency.gov.uk/subjects/waste/306772/241420/?version=1&lang=e](http://www.environment-agency.gov.uk/subjects/waste/306772/241420/?version=1&lang=e) (accessed 18 June 2003)

UNEP 2002, 'Leading manufacturers and Basel Convention to cooperate on the environmentally sound management of end-of-life mobile phones', United Nations Environment Program; available at [www.unep.org/documents/default.asp?documentid=274&articleid=3189](http://www.unep.org/documents/default.asp?documentid=274&articleid=3189) (accessed 18 June 2003)

- URS Forestry Pty Ltd 2002, *URS Forestry/Ausnewz: Pulp and Paper Yearbook 2002*
- US EPA 1993, *Household Hazardous Waste Steps to Safe Management*, United States Environmental Protection Agency, EPA-530-F-9203
- US EPA 2001, Fact Sheet, United States Environmental Protection Agency; available at [www.epa.gov](http://www.epa.gov)
- US EPA 2002, 'The Battery Act', *Enforcement Alert*, vol.5, no.2, March; available at [www.rbrc.com/graphics/PDF/BatteryAlert.pdf](http://www.rbrc.com/graphics/PDF/BatteryAlert.pdf)
- US EPA 2003a, 'Americans encouraged to recycle old computer equipment, televisions, other electronics in new campaign launched by EPA, industry retailers, recyclers', United States Environmental Protection Agency Newsroom; available at [www.epa.gov/epahome/headline3\\_011003.htm](http://www.epa.gov/epahome/headline3_011003.htm)
- US EPA 2003b, *Computer Display Partnership*, United States Environmental Protection Agency; available at [www.epa.gov/dfc/projects/computer/index.htm](http://www.epa.gov/dfc/projects/computer/index.htm) (accessed 13 June 2003)
- US EPA 2003c, *Labelling – Pesticides*, United States Environmental Protection Agency; available at [www.epa.gov/eftpages/pestpesticlabeling.html](http://www.epa.gov/eftpages/pestpesticlabeling.html) (accessed 18 June 2003)
- US EPA 2003d, *Product Stewardship: Tires*, United States Environmental Protection Agency; available at [www.epa.gov/epaoswer/non-hw/reduce/epr/products/tires.html](http://www.epa.gov/epaoswer/non-hw/reduce/epr/products/tires.html) (accessed 22 July 2003)
- White, S. 2001, *Independent Review of Container Deposit Legislation in NSW*, vols 1–3, Institute of Sustainable Futures, November
- WMAA 2004, *Energy-from-waste Discussion Paper*, Waste Management Association of Australia; available at [www.wmaa.asn.au/efw/home.html](http://www.wmaa.asn.au/efw/home.html)
- Woolcott Research Pty Ltd 2002, *A Benchmark and Evaluative Study of Knowledge, Attitudes and Behaviour Regarding Household Hazardous Waste*, November

## Further references

### *Australia*

**Total Environment Centre:** [www.tec.org.au/member/tec/projects/Waste/epr.html](http://www.tec.org.au/member/tec/projects/Waste/epr.html)

### *European Commission*

**Integrated Product Policy:** [europa.eu.int/comm/environment/ipp/home.htm](http://europa.eu.int/comm/environment/ipp/home.htm)

**Waste prevention and recycling programs:** [europa.eu.int/comm/environment/waste/strategy.htm](http://europa.eu.int/comm/environment/waste/strategy.htm)

**European Environment Agency:** [www.eea.eu.int/](http://www.eea.eu.int/)

### *Germany*

**Federal Ministry for the Environment, Nature Conservation and Nuclear Safety:** [www.bmu.de/](http://www.bmu.de/)

**Federal Environment Agency:** [www.umweltbundesamt.de/](http://www.umweltbundesamt.de/)

### *The Netherlands*

**Take-back regulations:** [www2.minvrom.nl/pagina.html?id=5003](http://www2.minvrom.nl/pagina.html?id=5003)

### *United States*

**Electronics Industry Alliance chemicals information:** [www.eiae.org/chemicals/index.cfm](http://www.eiae.org/chemicals/index.cfm)

**US EPA Product Stewardship Program:** [www.epa.gov/epr/](http://www.epa.gov/epr/)

**US EPA Resource Conservation Challenge:** [www.epa.gov/epaoswer/osw/conserve/index.htm](http://www.epa.gov/epaoswer/osw/conserve/index.htm)

**US EPA Computer Display Partnership:** [www.epa.gov/dfe/projects/computer/index.htm](http://www.epa.gov/dfe/projects/computer/index.htm)