Final Report

Product Stewardship in North America and Europe

Prepared for Department of the Environment, Water, Heritage and the Arts on behalf of the Waste Policy Taskforce
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1.0 Executive Summary

The Australian Department of the Environment, Water, Heritage and the Arts commissioned MS2 and Perchards to prepare a single, concise summary of the key features of, and outcomes arising from, international product stewardship or extended producer responsibility (EPR) schemes. This study complements a concurrent study into various Asian product stewardship and EPR schemes.

The following North American and European schemes were selected for analysis:

- The Dutch scheme for waste electrical and electronic equipment (WEEE);
- The French packaging take-back scheme (including Green Dot implementation);
- The Swiss arrangements for the collection and recycling of packaging waste;
- British Columbia's Encorp Pacific program for beverage containers and WEEE;
- Stewardship Ontario as an Industry Funding Organization (IFO);
- Canadian battery programs, such as those led by Waste Diversion Ontario;
- The Belgian take-back scheme for spent batteries;
- US programs for lamps and other mercury-containing products; and
- Adoption and implementation of the *Minnesota Electronics Recycling Act 2007*.

In addition, MS2 and Perchards critically examined the German and UK packaging schemes to advise the Department on how and why these schemes became costly and less effective than others, so that their lessons can be learnt for Australia. Germany's Green Dot and impacts resulting from Germany's introduction of container deposits on top of comprehensive recycling were specifically addressed.

There is no one product stewardship or EPR approach that could be simply copied and introduced into Australia for any given product of concern. It is essential to evaluate each program objectively, understand its drivers and evolution over time, and consider its potential applicability to Australian conditions.

Program drivers, political and legal factors that have influenced program evolution overseas can vary significantly from those in Australia. For instance, a variety of European programs were influenced by shortages of landfill capacity and resulting high costs of landfill, whereas landfilling in Australia is relatively inexpensive and landfill disposal cost is not a significant driver for product stewardship and EPR.

Stewardship Ontario initially focused simply on funding one-half of the costs of collecting and recycling commingled recyclables in the Blue Box program, then expanded into comprehensive resource recovery efforts across a broad range of municipal household solid and hazardous wastes. Similarly, Australian debate about product stewardship as a means of re-allocating costs of collection and recycling has focused primarily on packaging (National Packaging Covenant vs. container deposits) and progressively expanded over time to address broader resource recovery and a broader range of items.

When evaluating particular producer responsibility models, care needs to be taken in how lessons from one sector are applied to another. The German packaging take-back scheme shows how, in the packaging sector, replacing a monopoly producer responsibility system with an arrangement that allows alternative collective organisations to compete has been detrimental to overall efficiency. In contrast, the Belgian battery take-back scheme and the Dutch take-back scheme for WEEE demonstrate that monopoly organisations for long-life products may take such a conservative view of future liabilities that they accumulate quite unreasonably large reserves, which would not happen if rival compliance systems were competing on price.

As any program will likely involve some unintended consequences, it is important to ensure that program objectives and regulatory frameworks are established sufficiently in advance to promote effective program development. Similarly, program development and implementation need to be conducted in a flexible, transparent and accountable manner in order to effectively ensure stakeholder engagement. France's Eco-Emballages program for packaging started by working with highly committed and innovative municipalities on pilot schemes, then gradually expanding across the country as it learnt what worked under what conditions and at what cost, before finally tackling the places least cost-effective to service.

Care also needs to be taken when trying to make direct comparisons between countries or programs on key parameters. While some indicators such as tonnes of carbon dioxide equivalent are standardised and underpinned by fairly robust and understood methodologies, other parameters such as recycling rates can vary substantially in their methodologies. For instance, when comparing European and Australian recycling rates for packaging, it is important to understand that Europe counts the tonnage delivered to a reprocessor whereas Australia counts the output from the reprocessor. In Australian terms, European packaging recycling rates are not as high as they might appear.

Different industrial bases and relations between governments, industry and community groups can result in significant program variation from one program to the next. Programs that collaborate with affected stakeholders and build on the strengths of existing infrastructure, systems and networks (as in the North American efforts of Minnesota and the Product Stewardship Institute on WEEE and mercury-containing products, respectively) are more likely to have better results and may require shorter lead times to implement.

From a regulatory perspective, lessons from various schemes examined include:

- Program objectives must be clearly articulated.
- Stakeholders often imagine the worst in the absence of specific information about program development and tend to focus on fighting against program introduction. Collaborative approaches are helpful in progressing programs.
- It is important to ensure market intervention is seen as justified, fair and supportive of competition.
- Short implementation times are viable only if there has been effective stakeholder engagement in program design and existing or planned waste and recycling systems are taken into account.

- A robust process for establishing fee structures is essential to ensuring perception of the fees as fair, reasonable and based on actual program costs. The fee establishment process must also allow for regular revisitation as program fees are better understood and audited.
- Introducing product stewardship and EPR into existing marketplaces introduces concerns about redistribution of market share and concern about government picking winners and losers.
- Most manufacturers are active in global markets and tend to strive for consistent standards (whether formal or de facto) that have often been established in Europe. Australia is likely to represent such small market share that little change is likely to occur for some policy objectives such as driving 'design for environment'. That said, it should be noted that although EU Directives provide consistency in theory, individual Member States often go in various directions that result in significant disharmonisation. Australian officials should be wary of stated unity and harmony of European approaches, in particular.
- Manufacturers will be concerned about recovered products being re-introduced into the marketplace.

Such lessons and their potential applicability to Australia are further elaborated in the Product Stewardship Council's Product Stewardship Principles and Actions provided in Appendix B.

Given the myriad of product stewardship schemes and the potential to lose consumer attention, it may ultimately make sense to consider adopting materials-based approaches, such as those targeting mercury-containing products or specific metals.

2.0 Glossary

A$	Australian Dollar
ADF	Advance Disposal Fee
C$	Canadian Dollar
CDS	Container Deposit System
CED	Covered Electronic Device
CFCs	Chlorofluorocarbons
CFL	Compact Fluorescent Lamp
CHF	Swiss Francs
CIF	Continuous Improvement Fund (Ontario)
$CO_{2\text{-}e}$	Carbon Dioxide Equivalent
CPU	Central Processing Unit
CRF	Container Recycling Fee
CRT	Cathode Ray Tube
CSR	Corporations Supporting Recycling (Canada)
DEFRA	Department for Environment, Food and Rural Affairs (UK)
DEWHA	Department of the Environment, Water, Heritage and the Arts (Australia)
DSD	Duales System Deutschland
EC	European Community[1].
EfW	Energy-from-Waste
EHF	Environmental Handling Fee
EPR	Extended Producer Responsibility
EPSC	Electronics Product Stewardship Canada
ESABC	Electronic Stewardship Association of British Columbia
EUR	Euro
GBP	Great Britain Pound
GHG	Greenhouse Gas
IC&I	Industrial, Commercial and Institutional
IFO	Industry Funding Organization
ICT	Information and Communications Technology
LARAC	Local Authority Recycling Advisory Committee (UK)
MHSW	Municipal Hazardous or Special Waste

MPCA	Minnesota Pollution Control Agency
MS2	Martin Stewardship & Management Strategies Pty Ltd
NEPSI	National Electronics Product Stewardship Initiative (US)
NGO	Non-Government Organisation
OES	Ontario Electronic Stewardship
OMMRI	Ontario Multi-Material Recycling Incorporated
PERN	Packaging Export Recovery Note (UK)
PET	Polyethylene Terephthalate
POS	Point of Sale
POTM	Put on the Market
PRN	Packaging Recovery Note (UK)
PRO	Producer Responsibility Organisation
PRS	PET-Recycling Schweiz (Switzerland)
PSC	Product Stewardship Council
PSI	Product Stewardship Institute
PVC	Polyvinyl Chloride
RVM	Reverse Vending Machine
UK	United Kingdom
US	United States (of America)
US EPA	US Environmental Protection Agency
VAT	Value-Added Tax
VDD	Video Display Device
VRF	Visible Recycling Fee (Netherlands)
WDA	*Waste Diversion Act 2002* (Ontario)
WDO	Waste Diversion Ontario
WEEE	Waste Electrical and Electronic Equipment
WRAP	Waste Resources Action Programme (UK)

3.0 Introduction

The Australian Department of the Environment, Water, Heritage and the Arts (DEWHA or Department) commissioned MS2 and Perchards to prepare a single, concise summary of the key features of, and outcomes arising from, international product stewardship or extended producer responsibility (EPR) schemes. The Institute for Sustainable Futures is conducting a concurrent study into various Asian product stewardship and EPR schemes.

In consultation with the Department, the following North American and European schemes (hereafter collectively referred to as 'agreed schemes') were selected for analysis:

- The Dutch scheme for waste electrical and electronic equipment (WEEE);
- The French packaging take-back scheme (including Green Dot implementation);
- The Swiss arrangements for the collection and recycling of packaging waste;
- British Columbia's Encorp Pacific program for beverage containers and WEEE;
- Stewardship Ontario as an Industry Funding Organization (IFO);
- Canadian battery programs, such as those led by Waste Diversion Ontario;
- The Belgian take-back scheme for spent batteries;
- US programmes for lamps and other mercury-containing products; and
- Adoption and implementation of the *Minnesota Electronics Recycling Act 2007*.

In addition, it was agreed that MS2 and Perchards would critically examine the German and UK packaging schemes and advise the Department on how and why these schemes became costly and less effective than others, so that their lessons can be learnt for Australia. This analysis was to specifically address Germany's Green Dot and incorporate analysis of impacts resulting from Germany's introduction of container deposits on top of comprehensive recycling.

This report reviewed the following information, where available, for each of the agreed schemes:

- Basic description;
- Key features;
- Authority(ies) responsible for program implementation;
- Principal drivers for introduction;
- Funding source(s);
- Critical factors affecting program implementation and adoption;
- How the agreed schemes have worked in the program jurisdictions;
- Publicly reported program costs and benefits; and
- Lessons for Australia.

Given overlap in some components of the schemes examined, several schemes have been grouped by product and/or region. Key data sources for each scheme are provided in Appendix A.

Some of the programmes, particularly those in Europe, have been operating for many years and have evolved over time. In such cases we have described their evolution as well as summarising the current situation, as some of the issues addressed as the systems have developed will be highly relevant to Australia. Others are rather newer, and have been described more concisely.

The following exchange rates (current as of June 2009) have been used:

- C$1 = A$1.16
- CHF 1= A$1.14
- EUR 1 = A$1.72
- GBP 1 = A$2

A draft analytical framework was reviewed by members of the Product Stewardship Council's (PSC) Executive Committee for evaluation prior to literature review and stakeholder consultations[1]. A preliminary draft report was also reviewed by the PSC Executive Committee on a confidential basis prior to report submission to the Department. In addition, the PSC provided the PSC Product Stewardship Principles and Actions, last updated in May 2009 (Appendix B). The authors are grateful for the assistance provided by these and other stakeholders representing the schemes examined.

[1] Report authors Russ Martin (MS2) and David Perchard (Perchards) are co-founders and President and Vice-President, respectively, of the Product Stewardship Council. As the authors both serve on the PSC Executive Committee, draft materials were circulated on a confidential basis to the remaining members of the Committee for feedback. These additional Committee members include Scott Cassel, Executive Director of the Product Stewardship Institute (US); Garth Hickle, Product Stewardship Team Leader for the Minnesota Pollution Control Agency (US); and Ed Cordner, Chief Executive Officer of the National Packaging Covenant (Australia).

4.0 European Packaging Systems

Packaging was the first sector to be covered by producer responsibility rules in Europe. This began with Italy's Law no. 475 of November 1988 which required separate collection of containers for liquids from 1990. Local authorities remained responsible for collection, but all packaging manufacturers and importers had to join material-specific "consortia" set up to collaborate with local authorities on recycling. Consortium members had to contribute a levy to cover the consortium's operating costs. The law set a 50% recycling target for glass and metal containers for liquids, and 40% recycling plus energy recovery for the plastics covered by the law.

In the first half of the 1990s, however, the text that had the greatest influence on the development of packaging recycling across the EU was the German Packaging Ordinance of June 1991. This worked from the same template – producer responsibility, collective funding of recycling by industry, and material-specific targets – but it covered all packaging, and its economic impact extended far beyond Germany.

The German Packaging Ordinance required used packaging to be collected and taken back by the reprocessor free of charge. The collection targets were very high, and the vast quantities of material collected could not all be absorbed by the German recycling market. The surplus was exported, and reprocessors in other countries who had previously had to pay for material collected locally were now able to take in German material at a low or even negative price.

Some neighbouring countries decided that the best means of defence against this was to adopt legislation setting their own national targets to ensure that local packaging waste was still collected and that local reprocessors were not driven out of business by their subsidised German competitors. Some people of course felt that the German Ordinance was a good idea anyway, and deserved to be emulated.

The EU's response was to start work on a Directive on Packaging and Packaging Waste to restore some order by ensuring that all member states took steps to ensure that recycling systems were set up and developed. This was adopted in December 1994, and member states had to transpose its provisions into national law by July 1996. The Directive allowed for other options, but only Denmark, the Netherlands and the UK chose to deviate fundamentally from the model first devised in Germany. As we shall show, though, differences in the detailed design have resulted in major differences in the outcome.

In Chapter 4 we summarise the German packaging system, the rather more cost-effective French variant on it, and the entirely different market-based system established in the UK. The German Packaging Ordinance also sought to protect the refillable bottle (especially the refillable beer bottle) against competition from non-refillable bottles and cans, and it provided for mandatory deposits to be imposed as a penalty should the market share of refillables fall below the 1991 rates. This eventually happened, and a deposit system was introduced in 2003. We also describe and analyse the effects of this measure.

Switzerland is not bound by the Packaging and Packaging Waste Directive, and its producer responsibility legislation focuses on beverages rather than all packaging. The way it has been implemented conveys some interesting messages for Australia.

When comparing European and Australian recycling rates for packaging, it is important to understand that Europe counts the tonnage delivered to a reprocessor whereas Australia counts the output from the reprocessor. Depending on the quality of the collection and sorting system, discards at the reprocessor may be as high as 20%-30% (for example, in France some 15% of the plastic bottles delivered to recyclers are subsequently landfilled[2]). This means that in Australian terms, European recycling rates are not as high as they might appear.

4.1 The German Packaging Systems

Key features of the German Packaging Ordinance are provided in Table 1.[3]

Table 1: Key Features of the German Packaging Ordinance – Producer Responsibility for Packaging

First Implemented	1991
What it covers	All packaging, including point of sale (POS) packaging. The legal obligations are different for sales packaging (packaging that is made available as a sales unit and arises as waste at the final consumer), secondary packaging (packaging additional to sales packaging and is not necessary for transport to the final consumer for reasons of hygiene, durability or protection of the contents) and transport packaging (packaging that facilitates the transport of goods, protects the goods from damage during transport and arises as waste at the distributor). The political and legal focus has always been on sales packaging, which is a broader definition than household packaging.
Funding source and liability point	**Domestic:** Brandowners (including retailers in the case of home brands). **Commercial & industrial:** Manufacturers and distributors of transport packaging are legally responsible for taking it back from the end-user and for getting it recycled where this is technically possible and economically viable. In practice, either the supplier contracts with a third-party organisation to collect the used packaging on his behalf, or else the end-user deducts a certain amount from the invoice to cover the cost of managing the packaging waste.
Authorising legislation	The Ordinance now falls under the Closed-Loop Substance and Waste Management Act of 1994 and transposes the EC Packaging and Packaging Waste Directive of 1994.
Bodies (industry/ NGO/ government) responsible for managing the system	Originally Duales System Deutschland (DSD) was responsible for sales packaging, but there are now 9 dual systems. There is a market-based system for transport packaging.

Drivers and Scheme Development

Packaging waste had become a big political issue in Germany in the late 1980s, and the Federal Government was issuing a steady stream of regulations and non-statutory edicts which it expected industry to follow for fear of unspecified further action – a mandatory deposit on plastic beverage

containers, recycling targets, the share of the beverage markets which refillable glass bottles were expected to hold, and targets related to the design and labelling of non-beverage plastic packaging.

Producers responded by devising the dual system, an initiative designed to take used packaging outside the scope of the Waste Law and so bring an end to the uncertainty created by political pressure. Industry was prepared to pay a high price for this, so there was no suggestion of a formula to share costs and responsibilities with central and local government, such as had been adopted in Ontario, the first jurisdiction where a comprehensive packaging waste management system had been put in place.

The Government agreed to accept the dual system provided it was implemented quickly. Dual system participants would be exempted from mandatory deposits and compulsory take-back by retailers. However the eventual Ordinance was considerably more draconian than industry had expected.

The Government was expecting that there would be significant savings in local authority waste collection costs, and that the need to find outlets for the collected material would provide a major boost to the recycling industry. By forcing the pace of technological development in sorting and reprocessing, the Ordinance was expected to benefit German firms who could exploit Germany's first-mover advantage by selling their equipment abroad.

The original (1991) Ordinance introduced legal obligations for all packaging (except packaging with hazardous contents) but only set targets for sales packaging. Transitional targets applied from January 1993, but from July 1995, 80% by weight of each material had to be collected; and 90% of the glass, tinplate and aluminium collected and 80% of the paper & board, plastics and composites collected had to be sent for recycling. "Composite packaging" – a separate material category under the Ordinance – is packaging made from different materials which cannot be separated by hand and where no single material represents more than 95% of the total weight of the pack.

When the Ordinance was amended in 1998 to transpose the EC Packaging and Packaging Waste Directive, commercial and industrial packaging was allowed to count towards achievement of the following targets – overall 65% recovery and 45% recycling, and at least 15% recycling of glass, paper & board, metals and plastics. In addition, there were targets for *sales* packaging – at least 75% recycling for glass, 70% for paper & board, 70% for tinplate, 60% for aluminium and 60% for composites.

The fourth amendment to the Ordinance (December 2005) transposed the updated EU targets as follows – overall 65% recovery and 55% recycling, and material-specific targets of at least 60% for glass, 60% for paper & board, 50% for metals, 22.5% for plastics and 15% for wood. These targets had to be met by the end of 2008. The material-specific targets for sales packaging remained.

The targets for sales packaging now apply only to sales packaging at "private end-users" (households and restaurants and other such outlets supplying goods in similar packaging, and which accumulate in quantities no greater than can be collected in one bin of 1,100 litres per material per week).

Critical Factors Affecting Adoption and Implementation

Although the targets were extremely ambitious, in 1993 DSD collected 30% more packaging waste than it was obliged to. Little effort was made to estimate how much transport packaging was being

recycled until EU reporting rules came into effect. 1997 was the first year when an overall recycling rate was reported, and Germany's was 81%.

The recycling rate has declined every year since then and in 2006 it was 66%. The decline seems to have begun as a result of the opening up of DSD's sales packaging monopoly to competition – companies could easily claim to be "self-compliers" while doing nothing, and the organisations which offered "pooled self-compliance" in competition to DSD did not have the universal coverage obligation imposed on DSD. Thus, the most expensive collection activities were gradually withdrawn. This trend was exacerbated by the introduction of mandatory deposits in 2003, which diverted the most valuable material away from the close-to-home collection system, and then by the sale of DSD to a private equity house in 2004, when it abandoned its not-for-profit status.

Legal Obligations and Free Riders

The legal obligation: The basic concept is that producers should take complete financial responsibility for the management of sales packaging waste, setting up a separate close-to-home collection system operating in parallel to municipal waste management operations (hence the term "dual system"). "Close-to-home" collection can be either at the kerbside or through "bring" banks located in residential areas or shopping centres which are convenient to reach without making a special car journey. The dual system does not itself physically collect packaging waste, but in the early years was obliged to use a contractor nominated by each municipality.

The original Ordinance required manufacturers and distributors to take back used packaging and send it on for reuse or material recycling independently of the public waste disposal system. In the case of sales packaging, distributors were exempted from their take-back obligation where there is a comprehensive "dual system" which collects, sorts and passes on used packaging free of charge for recycling. Any type of sales packaging not covered by a dual system must be accepted back by the retail trade. Industry set up DSD (Duales System Deutschland) as a non-profit "self-help organisation" to provide a collective compliance service.

The legal obligation was fundamentally changed by the 5th amendment to the Ordinance (April 2008). For packaging "typically" supplied to "private end-users" (who include catering establishments, canteens and leisure sites using packaging similar to that supplied to consumers), the company that first places the packaged product on the German market, i.e. the brandowner (who may be a retailer in the case of home-brand), must join a dual system which funds the management of household packaging waste. There are now 9 dual systems to choose from.

Free-riding and the structure of the compliance organisations: DSD has consistently reported recycling rates above 100%: in 2007, 101% for glass, 143% for paper & board, 121% for plastics, 84% for composites, 100% for steel and 135% for aluminium. (These are not the national recycling rates, but the material collected through the DSD system for recycling as a proportion of the material on which Green Dot fees have been paid to it.) More material was put into its collection system than was licensed to it as a result of a combination of free-riding and householders putting non-packaging into the collection bins. It was estimated that 25% of sales packaging was free-riding in 2005.

In the early years, the level of compliance was relatively high, at least for sales packaging. There was little or no enforcement by the German authorities, but the on-pack Green Dot symbol, a trademark of DSD, the only dual system then operating, was

an effective enforcement tool. Use of the Green Dot was meant to indicate that the pack concerned was participating in the DSD financing system for sales packaging, and DSD vigorously pursued companies which infringed its trademark by displaying the Green Dot symbol when they had not paid for the right to use it.

The 1991 Ordinance assumed that all companies would join the DSD system and it made no provision for individual compliance, or for more than one recovery system for sales packaging. The 1998 revision changed this by imposing a range of obligations on companies not participating in DSD, such as data submission and meeting the targets. These rules would also apply to any other recovery systems, if established. If DSD found unlicensed packs in its collections, it was now able to claim back the cost of collection and sorting from the company concerned.

After 1998, competitors to DSD began offering services to benefit from the "self-complier" provisions of the amended Ordinance. Groups of self-complying companies were now permitted to pool their obligations and use a third party to meet them. Producers of packaged goods for hairdressers and drugstores believed that they could comply more cheaply through a self-compliance service than through DSD, but insufficient material was obtainable this way to enable them to meet their recycling targets. Therefore, groups of self-compliers began pooling surplus packaging waste collected from commercial private end-users (e.g. hotels and restaurants) to meet the obligations of other self-compliers (e.g. small retailers).

DSD could not benefit in a similar way because the Ordinance required it to collect from all households nationwide, and for years it tried to challenge "self-compliance" on legal grounds, arguing that each producer should only count towards its target the material that it took back itself. However, in 2006 a court ruling confirmed that self-compliers were entitled to meet their obligations by obtaining packaging waste from third parties classed as "private end-users".

The weakness of the rules for "self-compliers" was demonstrated in 2006 by a green NGO, NABU. NABU organised a campaign in which consumers attempted to return packaging to retailers that had opted not to participate in a dual system (particularly empty toiletry containers to certain drugstore chains, and used mail order packaging to the distributors). The campaign provided evidence that some retailers were refusing to accept the packaging and that staff in others were unused to handling the empty packaging because hardly any was ever returned by customers.

Meanwhile one waste management company, Landbell, mounted a wider challenge to DSD. In 1997 it set up a joint venture with a municipality which resigned its collection contract with DSD and started its own collection service. Landbell complained to the European Commission that DSD's trademark agreement restricted competition in that it did not allow a producer with obligations under the Packaging Ordinance to work with a competing contractor without double charging. DSD charged producers the full rate for use of the Green Dot even if their packaging was being handled by a competitor.

In 2001 the European Commission issued a Decision declaring that this practice was in breach of EU competition rules, and insisting that DSD allow companies to use its logo free of charge. When DSD appealed, the European Court of First Instance ruled that the Green Dot logo did have some value, and that DSD was entitled to charge a "reasonable fee" for the use of the trademark. However, the cost of its compliance service had to be unbundled from that.

Market data showed a steady increase in free-riding. As a result of free-riding, the emergence of rival dual systems and the loss of revenues from beverage producers obliged to leave DSD and set up a container deposit-and-return system *[see below]*, DSD's turnover was falling steadily.

Under pressure from BKA, the German competition authority, DSD abandoned its not-for-profit status in 2004 and is now controlled by a private equity house. Since it no longer operates on a not-for-profit basis for the benefit of companies subject to take-back obligations, there was a danger that DSD would respond to its declining revenues by taking a commercial decision to abandon its close-to-home collection activities.

Thus, DSD successfully argued that close-to-home collection could only be maintained if there was increased enforcement, ideally by amending the Ordinance to require all companies supplying packaging to consumers to participate in close-to-home collection. This change came into effect in January 2009.

There are now 9 dual systems operating in competition. DSD's market share is still more than 60%, the next biggest being DSI (part of the Interseroh waste management group). There is still only one collection contractor for packaging waste in each municipality, each dual system having access to the collected material according to its market share. Tendering for local collection contracts is co-ordinated by a clearing house that all dual systems must participate in.

The dual systems all operate "branch solutions" which collect sales packaging waste from commercial private end-users for recycling. The fee for including packaging in a branch solution is lower than for participation in a dual system. The branch solution is in fact an amended self-compliance option, the difference being that material collected from commercial private end-users can no longer be used to meet the targets for packaging supplied to households and similar packaging used elsewhere.

Other Features

Lead time to implement: The 1991 Packaging Ordinance gave industry just 18 months to set up a nationwide collection system for packaging waste.

Auditing and enforcement: Packers and fillers delegate their producer responsibility obligations to various dual systems and branch solutions. They report to these organisations on the tonnage of each packaging material they have passed over responsibility for, and this is the basis for the fees they pay. The compliance systems' contractors report back on the amount of packaging they have delivered for recycling, and in this way the organisations' recycling rates are established. Meanwhile the GVM market research company uses statistics on production of empty and filled packaging, surveys of packer/fillers, panel-based consumption analysis, store checks and surveys on purchased goods to estimate total packaging consumption in Germany. This enables the level of free-riding to be estimated.

The 1998 amendment to the Ordinance required producers to have their data submissions audited, for example through chambers of commerce. Small companies were permitted to comply through their suppliers.

The 2008 amendment tightens up the reporting arrangements, which are now managed by DIHK, the national chamber of commerce. Companies placing more than 80 tonnes of glass, 50 tonnes of paper and board, or 30 tonnes of plastic, metal and composite packaging on the market, must have their data audited by an auditor, tax consultant or certified accountant registered in Germany. Only 4,500 companies, about 5% of the total, need to be audited, but these 4,500 are responsible for 97% of Germany's sales packaging tonnage.

Public reporting information: DSD published its fee structure and issued detailed annual reports up to 2003, but since it became a private company it has released minimal information. Its competitors also regard information on progress as commercially sensitive.

None of the dual systems currently publish the fees paid by participating producers. Fees now appear to be at least to some extent negotiable. However, indicative rates for DSD are still published in the annual review of Green Dot fees across Europe published by PRO Europe, the umbrella organisation for the European "Green Dot organisations" and the general licensor of the Green Dot trademark.

However, the market shares of the various dual systems are now published.

Evaluation

The Ordinance was very successful in bringing about the creation of a comprehensive close-to-home collection system for household packaging waste, and the recycling rates achieved exceeded expectations. However:

- The system has been more expensive than it need have been. At DM 740 per tonne in 1994 (then worth around A$640), it cost twice as much as the collection and disposal of the rest of Germany's household waste. DSD was under a legal obligation to see that the dual system was in place everywhere within 18 months, and its bargaining power with its contractors was effectively nil. Collection and sorting were done on a cost-plus basis, and contractors were paid according to the quantity of material collected rather than the output of recyclable material from the system. As contracts were renegotiated, DSD was gradually able to take costs out of the system (DSD's costs fell by nearly 10% from DM 4.1 billion or A$3.9 billion in 1995 to DM 3.7 billion in 1999), but it was still far more expensive than the systems in other EU countries. In 2000 Taylor Nelson Sofres published a comparison of the costs of financing the recycling of household packaging waste (Table 2).

Table 2: Financing the Recycling of Household Packaging Waste - Selected European Countries

EUR/t sorted	France	Germany	Netherlands	UK
Taxpayers/charities (i.e. material collected by local government and charities)	41	0	53	-10
Fillers/importers	40	315	0	0
Packaging chain	0	0	0.08	38

By 2002, DSD's turnover had fallen to EUR 1.9 billion (A$ 3.3 billion), but by this time it was only responsible for about 70% of the market. That suggests a total cost of around A$4.7 billion. Unfortunately it is no longer possible to estimate the overall cost of the German household packaging waste management system as neither DSD nor the other dual systems publish their accounts.

The conflict between DSD's role as a private company with a public benefit function and Germany's traditional anti-cartel stance has produced sub-optimal results, largely because before

2008 the rules were amended in an ad hoc response to court rulings rather than being rethought in their entirety:

- The 1998 amendment allowed competitors to DSD to emerge and "cherry-pick" material which could be collected at relatively low cost, while DSD was still bound by its legal obligation to fund a close-to-home collection service for all German households.
- When DSD was first formed, the German competition authority (BKA) issued a Decision that it would "tolerate" DSD as a monopoly, but this did not establish clear ground rules for how DSD should operate. When German competition law was amended in 1999, it established an exemption for organisations fulfilling take-back and recycling obligations, subject to certain criteria. In 2002 DSD formally applied for an exemption from competition rules, but the BKA argued that DSD had a dominant position in the market for waste management services and announced that it would issue a prohibition order against DSD effective January 2007. To avoid further legal conflict, DSD abandoned its non-for-profit status and legal action against Landbell's rival dual system.

Thus, the principle on which all Green Dot organisations were founded – as organisations operated by the packaging chain to meet their pooled legal obligations – was abandoned in Germany.

Lessons for Australia

The fundamental objective of the German Packaging Ordinance – to ensure that every household has convenient access to a collection, sorting and recycling system for packaging waste – is irrelevant in Australia, where there is already a comprehensive kerbside collection system.

However, the unintended consequences of the Ordinance may be instructive when producer responsibility for other product sectors is under consideration:

- Allowing producers time to assess the findings from pilot schemes and then roll out successful models – as in France – is likely to produce more cost-effective results in the long term than insisting on quick results.
- There are conflicting views about the merits of competition versus monopoly in respect of household waste management. In the WEEE sector, there is evidence that the monopoly systems (in the countries first to establish legislation on WEEE) are more expensive than the competitive systems, but there is more than one way of ensuring competition – for example, a monopoly compliance organisation may contract out all its operations by competitive tender.

It is clear, though, that there is much more transparency with a monopoly system, which can report on its activities without giving away information to a competitor. It can also afford to take the long view, particularly on building consumer awareness, rather than being driven by short-term pricing considerations. Among other things, it can keep its fees stable by building up reserves in the early years which are gradually dissipated as the system is rolled out nationally; where price competition rules, fees tend to fluctuate which is unhelpful for producers' budgeting.[2]

[2] This is not necessarily true of producer responsibility systems in all sectors. It is conventionally assumed that the amount of packaging placed on the market in any one year is the same as the amount sent for reprocessing or disposal. This makes estimation of future liabilities much easier than in the WEEE sector, where the market is still growing rapidly but where

If the authorities opt for a monopoly approach and later change their minds, it is essential that there is fair competition between the erstwhile monopoly and its new competitors. Grafting a degree of competition onto an existing monopoly simply doesn't work.

It should also be noted that waste management is a highly sensitive political issue in Germany, and it has proved very difficult to get a coherent policy measure through the Upper House, where the *Länder* (federal states) are represented. Thus, the amendments to the Ordinance have involved a great deal of compromise.

Key features of the beverage container provisions of the German Packaging Ordinance are provided in Table 3.[4]

Table 3: Key Features of the German Packaging Ordinance – Beverage Container Provisions

First Implemented	Enabling legislation since 1991, deposit law in force since 2003.
What it covers	All beverage containers.
Funding source and liability point	**Funding source:** Drinks producers, importers, wholesalers and retailers. **Liability point:** Deposit initiators, redemption centres, wholesalers and large retailers, label printers and can makers, service providers (financial clearing, data systems, reverse vending machine supply, logistics and recycling) must all register with the deposit system operator, DPG.
Authorities / (industry/ NGO government) responsible for implementation	When the deposit law was first introduced in 2003, there was no central control, but from May 2006 the trade associations representing the retailers and the food producers formed a not-for-profit company, DPG, to: • conclude contractual agreements with all participants in the system, each of whom must register with DPG – fillers, importers, retailers, other redemption centres, service providers, suppliers of reverse vending machines (RVMs), operators of counting centres, label printers including can makers, etc; • control use of the security on-pack logo, whether directly printed on the pack, or fixed using a sticker (DPG owns the rights to the logo); • manage the central database used for deposit clearing; • approve all participants' data systems and equipment (RVMs, label printers etc), and ongoing quality control, to ensure the smooth operation of the system; and • undertake marketing and PR activities. DPG does ***not*** handle: • ***The mechanics of refunding deposit monies between retailers and fillers.*** DPG does not handle money flows, nor have information about deposit monies received and refunded by producers and retailers. This is the role of commercial service providers (mainly existing deposit system operators, data processors, waste management companies, etc.). Thus, DPG has no information about unredeemed deposits and is

items replaced are not necessarily disposed of (a household may have more and more TVs or computers in use, they may store them for some uncertain future use, or they may be handed down to family or friends). As section 6.1 demonstrates, monopoly organisations may take such a conservative view of future liabilities that they accumulate quite unreasonably large reserves, which would not happen if rival compliance systems were competing on price.

	unable to use this money to help fund its activities. • ***Contracts between service providers and their clients, nor the fees charged.*** However service providers must register with DPG and have their arrangements approved by DPG. Several service providers are operating, and each producer and retailer must negotiate individually with them. • ***The transport of returned containers for recycling.*** Individual retailers contract waste companies (or service providers), and each must provide evidence to the authorities that the containers have been recycled. Retailers purchase their own RVMs, or make other arrangements for refunding the deposit and counting the containers. They negotiate directly with their suppliers on any arrangements to share the costs of this. Distributors with a sales area of less than 200m^2 may limit return and refund to brands that they sell. The smallest retailers (kiosks etc) do not participate in the DPG system but take their empties to the nearest supermarket to get back the deposit that they have refunded to their customers.

Drivers and Scheme Development

The driver for the German deposit law was defence of the refillable bottle, partly because this was believed to be more resource-efficient (depending on transport distances) and less likely to create litter, and also because limitations on the use of non-refillables protected small local German brewers from competition from further afield[5].

The 1991 Ordinance said that a mandatory deposit would be imposed on any type of beverage container if DSD's recycling targets were not met and if the national market share of refillable containers fell below 72% (the rate prevailing in 1991). The 72% quota originally related to each *Land* (federal state), but applied across the board to beer, water, soft drinks, juices and nectars and still wines. However, the 1998 amendment to the Ordinance changed this: deposits would only be imposed on a product sector whose refill market share fell below the 1991 level nationwide.

In 1997 the overall market share of refillables fell below the 1991 level for the first time, and after prolonged discussions and many legal proceedings, mandatory deposits on non-refillable containers for water, beer (and drinks containing beer) and carbonated soft drinks were finally introduced in January 2003.

Because the deposit law was intended as a sanction for non-achievement of the refill target rather than an objective in its own right, the Ordinance did not prescribe how the system was to work. As a result, no nationwide deposit/return system was set up, but only a series of independent arrangements. "Open systems", where retailers redeemed the deposits on each others' containers, accounted for about 20% of the market but "island solutions", operated mainly by discount chains, predominated. The law obliged retailers to take back only containers of the material, shape, size or brands that they sold, and to avoid having to set up a clearing arrangement to reconcile deposits charged and deposits redeemed, island solution operators took back only the special containers that they stocked. Each island solution had its own on-pack symbol and refused containers without it.

The European Commission did not regard this as a properly functioning return system in line with EU rules. Competition was distorted because cans were almost eliminated from the market (there was no place for them in island solutions because they could not be produced with a special shape), and imported mineral waters were put at a competitive disadvantage (under EU law, mineral waters must be bottled at source, so refilling was impracticable). The Commission launched proceedings

in the European Court of Justice, and following Court rulings in December 2004 the German Government introduced a further amendment to the Ordinance in May 2005.

The market share quotas for refillables were repealed, and deposits extended to all "environmentally unfavourable" beverage containers, not just packaging for those beverages that had failed to meet the refill quotas. (The law does not set criteria for "environmentally unfavourable" containers, but these are defined as all containers except refillables, beverage cartons, PE pouches and foil pouches and, since April 2009, cylindrical cartons and plastic containers made from at least 75% renewable materials.)

Distributors must now take back any containers made of the same material as those they sell, but not those of other materials (i.e. if they don't sell cans, they don't have to take them back). Also, the deposit system was extended to include uncarbonated soft drinks and alcopops. There was still no mandatory deposit on fruit and vegetable juices and nectars, drinks containing at least 50% milk or milk-based products, and "dietetic beverages", though since April 2009 the only dietetic drinks exempted from the deposit obligation are drinks exclusively supplied to infants and small children and drinks provided to patients under medical supervision – and even these are subject to the deposit if supplied through normal retail distribution channels.

Critical Factors Affecting Adoption and Implementation

Logistics: During the "island solution" phase, most retailers redeemed deposits manually at the checkout, but there has since been heavy investment in RVMs to operate the DPG system. By the end of the first year of the revised system, there were 15,000 RVMs throughout Germany and around 70 counting centres. All retail chains except two had invested in RVMs, and 80% of containers were being handled that way.

When the deposit first took effect, most retailers handled logistics themselves, backloading empty containers when deliveries were made. However, most have now appointed a waste contractor to collect the empties. This seems to be primarily for hygiene reasons, rather than cost or other factors. There is also a marked trend for retailers to use different service providers for different services (one for logistics, another for data handling etc) although service providers offer all relevant services.

Key stakeholders: Stakeholders were heavily involved with design of the DPG system: a series of specialist working groups developed proposals on specific aspects which were fed upwards through a series of committees representing producers, importers, retailers and packaging converters.

Legal Obligations and Free Riders

Free-riders: There are two forms of free-riding:

- non-refillable containers claiming to be refillable – the deposit on refillables is EUR 0.08 (A$0.14) for beer and EUR 0.15 (A$0.26) for other drinks, and on non-refillables it is EUR 0.25 (A$0.43); and
- products claiming to be outside the scope of the deposit system.

Site surveys carried out for the European Commission by Perchards in 2006-7 found that:

- Imported specialty beers were often sold as refillables even when produced outside Europe. Importers told Perchards that participation in DPG is simply too expensive for the small quantities of each beer imported. To recover the cost of registration, the retail price of the beer would have to *increase* by around EUR 0.30 (A$0.52) per bottle, which is more than the total price excluding deposit of standard German beers. One importer told Perchards that it had lost around half its customers since the deposit was first imposed. Marking the bottles as refillable and charging only a EUR 0.08 deposit reduces the perceived price by EUR 0.17 (A$0.29).
- In shops catering for immigrants, drinks imported from the home country were sometimes not correctly labelled and were sold without the deposit.
- The enforcement authorities did not appear to be addressing either non-compliant upmarket specialty drinks or ethnic drinks.

Before the 2008 amendment of the Ordinance, some drinks were claiming exclusion from the deposit on the basis of a very liberal interpretation of a "dietetic drink" (sports drinks, energy drinks, drinks with added vitamins), but this has now been addressed. A lot of product development in Germany appears to have been aimed at finding ways of getting products into the non-deposit category – fruit-flavoured drinks containing at least 50% dairy products (whey), or alcopops containing more than 15% alcohol or more than 50% wine.

Other Features

Lead time to implement: Only 6 months was allowed between confirmation that a mandatory deposit was to be imposed and the 1 January 2003 implementation date. The European Court of Justice ruled that this was insufficient to allow producers to adapt and when the 5th amendment to the Ordinance revised the deposit law, a 12-month transitional period was allowed for the beverage container provisions.

Auditing and enforcement: DPG is not responsible for enforcing the system and has no powers to force first suppliers and retailers to charge and refund deposits correctly. Enforcement is the responsibility of the relevant authority in each *Land*. However, DPG invites registered participants to tell it about any breaches they become aware of, and helps them notify the relevant authority.

Free-riders are liable for fines of up to EUR 50,000 (A$87,500), but it is up to the courts to specify the actual amount in each case and some *Länder* have established guidance for this. North-Rhine Westphalia sets the fine for a breach of 'average severity' at between EUR 50 and EUR 2,600 (A$88 - 4,550), with higher fines imposed for repeated offences.

Public reporting information: The Ordinance omitted to require the publication of return rates. Since DPG does not handle money flows, it does not have robust information on return rates, and unlike the Nordic deposit systems it does not publish an annual report.

Targets: Market share of refillables and "environmentally favourable" non-refillables to be 80% by 2010, when effectiveness of the law will be reviewed.

Evaluation

Official data show that the introduction of mandatory deposits has accelerated rather than reversed the decline of refillables in Germany (Figure 1).[3]

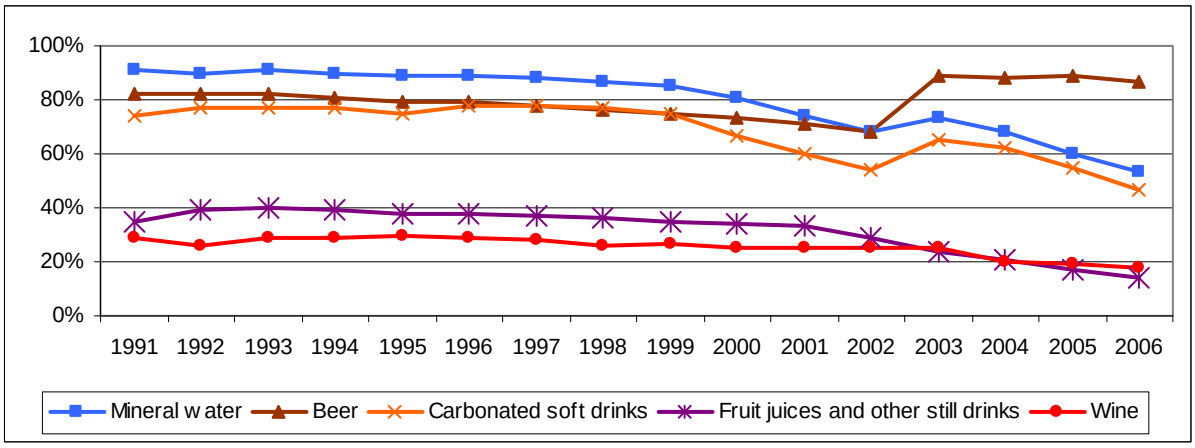

Figure 1: Declining Role of Refillables in Germany

The food industry association BVE (which shares ownership of DPG with the retailers) estimates that the return rate for deposit-bearing containers is "over 90%", but some other commentators believe that it is considerably less, particularly for small bottles where it may be below 70%. There are reports of security measures having to be introduced at sorting plants to prevent staff removing deposit containers to claim back the deposit.

Roland Berger, the consultancy advising DPG, has estimated that the initial investment by industry was EUR 726 million (A$1.25 billion), of which EUR 702 million (97%) was paid by the retailers, mainly for the installation of RVMs, and EUR 24 million by "industry", i.e. drinks producers and importers, packaging manufacturers (including label printers and can makers). Roland Berger estimates the annual costs for retailers to be EUR 699 million (A$1.2 billion) and for industry EUR 94 million (A$162 million). This is based on a market size of 14 billion deposit-bearing non-refillable containers, and equates to a set-up cost of around A$15.50 per capita and annual costs of A$16.90 per capita.

DPG stated in May 2008 that the cost per container was three times as much as household-based collection, and that deposit-bearing containers were contributing 2.7% to the national recycling rate.

[3] The market share of refillable bottles is still significant in a number of European countries, but even in those countries it is everywhere in decline. The logistics costs of non-refillables are lower, so they are relatively cheap to buy as well as being more convenient for consumers; for the same reason, producers tend to replace worn-out filling lines for refillables with new non-refillable lines. Small bottlers have tended to stay with refillables longer because they lack the capital to invest in replacement lines, but they have gradually gone out of business, supplanted by big brands distributing drinks over longer distances. In Germany, there is intense brand loyalty to small local breweries, so sales of beer in refillables have held up, but for soft drinks and mineral waters the local brands are disappearing fast. The 2003 Ordinance gave the discount chains which dominate food retailing in Germany the opportunity to win market share for their house brands through "island solutions", which accelerated the decline of the local bottlers and their refillables.

Lessons for Australia

Germany is the first and so far the only jurisdiction to superimpose mandatory deposits onto a comprehensive producer responsibility regime for packaging. This duplication has added considerably to cost, and its impact on overall recycling rates has been only marginal (though as noted above, declining recycling rates are also attributable to problems with the producer responsibility system) (Figure 2).

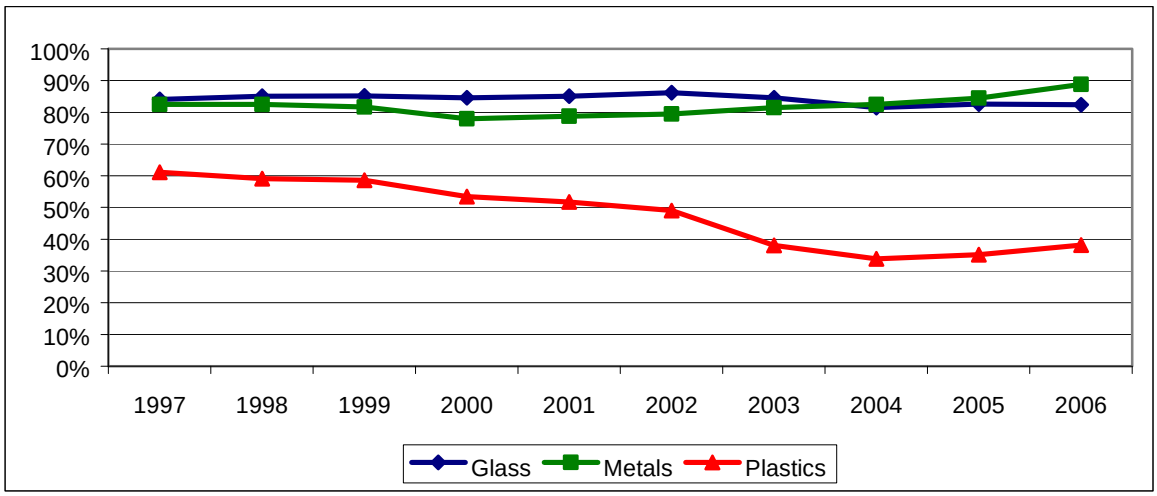

Figure 2: Container Material Recycling Rates in Germany – 1997 to 2006

Australia already has a comprehensive kerbside collection system yielding good recycling rates, and here too duplication could be expected to add more to costs than to recycling rates. If Australia decided to impose mandatory deposits, it is unlikely that it would opt for a system as complicated as Germany's; however, given that Australians are unused to taking empty bottles back to the store or even to "bring" facilities in town centres or supermarket car parks, it is probable that a high deposit would be needed as an incentive, and in that case expensive security measures would be needed and probably also RVMs to ensure that deposits charged and deposits redeemed were properly reconciled between the various operators.

An important lesson is the need for proper planning with the assistance of industry experts to ensure that the deposit system cannot be subverted by market forces.

It is also necessary to establish clear boundaries between deposit-bearing and non-deposit-bearing products. Consumers, and possibly some small businesses, were confused by the distinction between, for example, deposit-bearing uncarbonated water and deposit-free flavoured uncarbonated water between 2003 and 2006, and between deposit-bearing fruit drinks and deposit-free fruit juice and fruit juice/whey combinations now. Drinks are displayed on German supermarket shelves by product type, not by container type, so they are rarely set out in different parts of the supermarket.

The widespread (though not universal) use of the DPG logo on non-refillable deposit-bearing containers since 2006 does however make it much easier to identify most deposit-bearing non-refillables if the consumer takes the trouble to inspect the container (and understands what the logo means!).

4.2 The UK Packaging System

Key features of the UK Producer Responsibility Obligations (Packaging Waste) Regulations are provided in Table 4.[6]

Table 4: Key Features of the UK Producer Responsibility Obligations (Packaging Waste) Regulations

First Implemented	1997
What it covers	All packaging – commercial, industrial and domestic.
Funding source and liability point	Raw material producers (6% share of the recovery/recycling obligation), packaging converters (9%), packer/fillers (37%), and sellers to the final end-user, whether a private household, a business or the public sector (48%).
Authorising legislation	The European Communities Act 1972 and the Environment Act 1995.
Bodies (industry/ NGO/ government) responsible for managing the system	The whole point of the UK approach is that it is a market-based system, not an "administrative system" like those in place in France, Germany and almost every other European country. It is supervised by the Environment Agency for England and Wales, the Scottish Environment Protection Agency and the Northern Ireland Environment Agency.

Drivers and Scheme Development

The policy driver was the EC Packaging and Packaging Waste Directive of December 1994, which required member states to take measures to ensure that the EU recovery and recycling targets were met.

The UK regulations were designed with the aim of meeting this legal obligation at minimum cost. The UK system does not distinguish between packaging from households and packaging from commercial and industrial sources, and it was always recognised that as the latter can be collected and recycled more cheaply, activity would largely focus on non-household packaging.

Instead of encouraging the push-through of material from collectors by supporting the costs of collection and sorting as in conventional European producer responsibility systems for packaging, the UK is aiming for material to be pulled through by the reprocessors. Subject to certain *de minimis* exemptions, every supplier in the packaging chain must obtain certificates to show that an appropriate tonnage of material has been reprocessed on his behalf. "Reprocessors" must be accredited, and must carry out an approved recovery operation. For example, reprocessors of used paper and board are not only paper mills, but also other manufacturers using waste paper in a production process, such as loft insulation or animal bedding producers.

Packaging Recovery Notes (PRNs) and Packaging Export Recovery Notes (PERNs) are the system's funding source. Accredited reprocessors issue PRNs for the materials they reprocess, which obligated companies and collective compliance schemes use as evidence of compliance. Where packaging materials are sent to a reprocessor outside the UK, the exporter issues a PERN (this must not be issued until the exporter has documentary proof that the exported material has been delivered to a reprocessor).

PRNs and PERNs can be traded, and the idea is that the resale value of the certificates will give reprocessors a further incentive to expand capacity or to support the collection of packaging waste.

Critical Factors Affecting Adoption and Implementation

The basic principle of the Continental "Green Dot" model is that recovery organisations provide local authorities with a consistent level of funding by supporting operating costs. The mechanism is a support payment per tonne of packaging waste delivered to a reprocessor, provided the material meets agreed specifications.

In the UK, on the other hand, the PRN/PERN system pays for evidence that used packaging material has been delivered to a reprocessor. The price of these evidence certificates is determined by supply and demand for them, so the level of the recovery and recycling targets is critical. If there is equilibrium between the supply of used packaging material for recycling and the amount needed to meet the targets, then the system essentially pays only for administration and consumer awareness, in which case PRN prices fall. But if higher targets are set, PRN revenues are used to attract more material into the market and so prices rise. Thus for the PRN system to generate the same amount of revenue each year, recycling targets need to increase year by year.

Figure 3 plots average PRN/PERN prices (in GBP) in two-monthly intervals between January 2006 and May 2009.

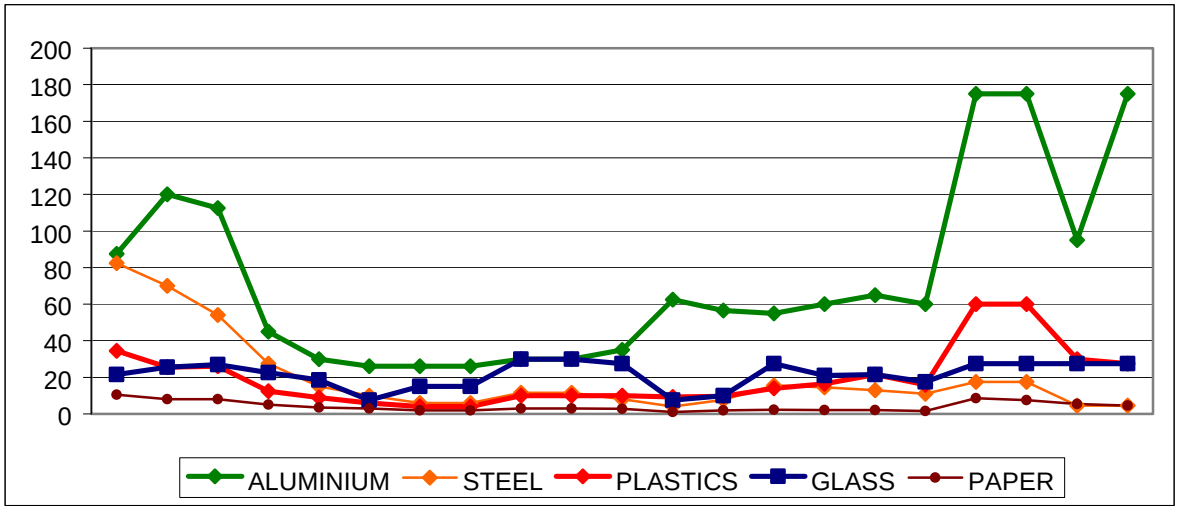

Figure 3: PRN/PERN Prices (in GBP) - 2006 to 2009

In its new Packaging Strategy document[7], the UK Government explains that the central idea of market-based producer responsibility systems like the UK's is that they are set up to boost the reprocessing infrastructure, the collection infrastructure, or both, where the market on its own would not have done enough for targets to be met. They are intended to pay for recycling that would not have happened otherwise, not for the full cost of recycling packaging. They assume that recycling should over time become the waste management method of choice for businesses as well as local authorities, because of the rise in the cost of landfill, and of the value of recyclates.

Legal Obligations and Free Riders

Every company which carries out one or more of the "activities" described above and supplies to another stage in the supply chain more than 50 tonnes of packaging per annum and has an annual turnover above GBP 2 million (A$4 million), has a legal duty to register with the relevant authorities as an "individual complier" or with a collective compliance scheme, supply data, and meet its share of the targets, either through individual action or through collective activity.

Fewer than 1% of British companies are above the *de minimis* thresholds, so the "business targets" for obligated companies are set at levels which takes account of free-riding and the *de minimis* exemptions. Thus, the national recycling rate is lower than the business target rates.

Each obligated company calculates its obligations using the formula:

(tonnage of packaging supplied) x (activity obligations) x (recovery or recycling target),

the "activity obligation" being the percentage shares shown above. Importers bear a rolled-up obligation for all activities that took place abroad, i.e. a packaged goods producer using imported packaging would be responsible for the raw material producer's and the converter's share as well as his own packer/filler obligation, while a retailer selling imported packaged products would be liable for 100% of the obligation.

There is no obligation on packaging end-users, except in respect of imported transport packaging arising as waste on their premises.

Pubs, clubs, restaurants and cafes are responsible for the seller's obligation on the packaging of beverages supplied for on-premise consumption.

If more than one company is involved in the conversion stage (e.g. a board converter and a laminator), the last company involved at that stage picks up the obligation, i.e. the laminator and not the board converter.

In practice most companies fall into several categories:

- a packaged goods manufacturer not only bears the packer/filler obligations for the sales packaging of goods he packs and supplies to a retailer, but also bears the seller's obligations for the transport packaging of those goods;
- the converter also carries a 37% obligation as the packer/filler of the transport packaging he uses and a 48% obligation as the supplier of this transport packaging to the end-user;
- businesses that lease or hire out packaging such as wooden or plastic pallets pick up an 85% service provision activity obligation for all *first trip* leased packaging. The remaining 15% should already have been picked up by the raw material manufacturer (6%) and the convertor (9%).

To keep PRN/PERN prices at a reasonable level and to ensure that the EU targets are achieved, the UK targets are revised every year. Taking the example of a packaged goods producer, by January 2010 he should have obtained evidence showing that:

- material equivalent to 27.01% of the tonnage of packaging he supplied (i.e. 37% of the ***73% recovery target*** for 2009) has been recovered on his behalf;

- material equivalent to 24.85% of the tonnage of packaging he supplied has been recycled on his behalf ***(i.e. 92% of the 27.01% above; at least 92% of the 73% recovery target for 2009 must come from recycling);***
- material equivalent to 29.60% of the tonnage of ***glass*** containers he supplied (i.e. 37% of the ***80% recycling target*** for 2009) has been recycled on his behalf;
- material equivalent to 9.99% of the tonnage of ***plastics*** packaging he supplied (i.e. 37% of the ***27% recycling target*** for 2009) has been recycled on his behalf;
- material equivalent to 14.06% of the tonnage of ***aluminium*** packaging he supplied (i.e. 37% of the ***38% recycling target*** for 2009) has been recycled on his behalf;
- material equivalent to 25.35% of the tonnage of ***steel*** packaging he supplied (i.e. 37% of the ***68.5% recycling target*** for 2009) has been recycled on his behalf;
- material equivalent to 25.35% of the tonnage of ***paper & board*** packaging he supplied (i.e. 37% of the ***68.5% recycling target*** for 2009) has been recycled on his behalf;
- material equivalent to 7.77% of the tonnage of ***wood*** packaging he supplied (i.e. 37% of the ***21% recycling target*** for 2009) has been recycled on his behalf.

Composite packaging materials are reported according to the predominant material by weight.

Reusable packaging is subject to these obligations when first placed on the market, but does not bear an obligation when subsequently reused.

To simplify the data obligations for "small producers" – those above the tonnage and turnover thresholds but with an annual turnover of no more than GBP 5 million (A$10 million), they may opt to calculate their recycling obligation according to the "allocation method":

Recycling obligation (in tonnes) = annual turnover (in GBP million) x recycling allocation

The recycling allocation is 28 in 2009 and will be 29 in 2010. Thus a company with a turnover of GBP 4 million has a recycling obligation for 2009 of (4 x 28 =) 112 tonnes.

All obligated companies can either comply individually or join a compliance scheme and delegate their obligations to it. Unlike Germany, where producers can split their obligations between several dual systems, in the UK they can only sign up with one. Schemes' obligations are the aggregated legal obligations of their members. The largest scheme is Valpak, which was set up by companies in the packaged goods supply chain, but the UK competition authority ruled that a monopoly would be unacceptable and at the last count 22 compliance schemes were operating. The other compliance schemes are run by waste management companies, material sectors or product sectors.

The schemes' role is to buy PRNs and PERNs on behalf of their members. Unlike their Continental and Irish counterparts, they do not get involved in operations.

An obligated producer whose main activity is as a seller must provide information to consumers of the goods sold by him about the return, collection and recovery systems available, how consumers can contribute to the system, and the meaning of markings on the packaging that relate to recovery and recycling.

Free-riders: The PRN system makes individual compliance an option for any company, whereas it is not feasible for a consumer goods company to take back or fund the take-back of its own packaging waste under the Continental model. And individual compliance makes free-riding relatively easy. The Advisory Committee on Packaging, an industry body which is an official advisor to DEFRA (the Department for Environment, Food and Rural Affairs), has long been urging the Government to remove the individual compliance option; the UK's WEEE Regulations have already set a precedent for this. So far, DEFRA has not agreed.

Probably for this reason, there has been more active enforcement of the producer responsibility regulations in the UK than in any other European country. There are frequent prosecutions for failing to register either with one of the Agencies or with a recovery organisation and/or not taking "reasonable steps" to get the appropriate tonnage of used packaging recycled. The largest fine so far has been GBP 225,000 (A$450,000), plus costs of GBP 3,231 (A$6,462) and GBP 2,486 (A$4,972) compensation to the Environment Agency. The company concerned had pleaded guilty to nine packaging offences including not meeting recovery and recycling targets, failure to register with a packaging regulation body and failure to submit certificates of compliance in 2003, 2004 and 2005. The company had avoided registration fees of GBP 2,486 (A$4,972) and recovery/recycling costs of GBP 185,059 (A$370,118).

Other Features

Lead time to implement: The original UK regulations passed into law in March 1997. In 1997 only the registration and reporting requirements took effect, the first set of recovery and recycling targets being those for 1998. Thus, obligated companies had to submit evidence of compliance for the first time early in 1999.

For a few years early in the present decade, targets were set a year at a time. Obligated producers and compliance schemes protested that this made it impossible to plan properly, and the targets are now once more announced several years at a time, though they are reviewed annually.

Auditing and enforcement: Compliance schemes have to register with one of the three environment agencies, submit data on their members' behalf and meet targets. Each year they also have to submit an updated operational plan to the relevant Agency and to DEFRA, showing how they propose to meet the targets. Companies joining a compliance scheme have to submit exactly the same data to the scheme as they would have sent to the Agency if they had opted for individual compliance.

The Agencies have the right to audit obligated companies' data, and compliance schemes may audit their members' data.

Compliance schemes are legally responsible for the recovery and recycling obligations of their members. They are required to have specific arrangements in place to monitor members' data and must describe these in their operational plans.

Producers choosing not to join a collective scheme must register with the appropriate Agency as an "individual complier". Those which have an obligation for more than 500 tonnes of packaging must submit an operational plan to the Agency and to DEFRA.

Reprocessors and exporters issuing PRNs and PERNs have to be accredited annually. Applications for accreditation must be accompanied by a business plan explaining how the funds acquired from the issue of PRNs or PERNs are to be applied, including information on the following:

- the development of capacity for the collection and reprocessing of packaging waste and the development of new markets for materials or goods which have been made from recycled \packaging waste;
- arrangements for the collection and sorting of packaging waste; and
- the strategy, including communications, to be adopted to achieve these outcomes.

The Agencies may refuse accreditation to reprocessors and exporters that have, for example, committed offences against the Trans Frontier Shipment of Waste Regulations, or have been convicted of an offence relevant to the collection, treatment, recovery or recycling of packaging waste.

The Environment Agency for England and Wales enforces regulations covering the standards which overseas paper mills, steelworks and smelters must meet if they issue PERNs on material such as plastics and cardboard sourced from the UK.

Public reporting information: The agencies publish lists of registered producers, registered compliance schemes and authorised reprocessors, as well as data on the tonnages of each packaging material handled and the tonnages reprocessed.

Complementary measures: To encourage the diversion of waste into recycling, composting or energy recovery, a landfill tax was introduced in 1996. This rises year by year and is now GBP 40 (A$80) per tonne.

The Household Waste Recycling Act 2003 requires local authorities to collect at least two types of recyclable waste by 2010. The Government also requires local authorities to divert biodegradable waste from landfill as required by the EC Landfill Directive, so local councils have focused on collecting materials like newsprint and garden waste. Kerbside collection exists widely for metals, glass and plastic bottles and some paper and board packaging, but capture rates are low and the material is usually collected commingled to keep collection costs down. Local authorities receive no direct subsidy from producers for packaging waste management, though the price paid by recyclers may be higher if supported by PRN revenues (whether the material value goes to the local authority or to its waste management service provider, depends on the contracts made).

Evaluation

It has become clear that while the original objective of low-cost compliance has been achieved, the UK's market-based system has failed to address political and environmental imperatives.

The UK Government's Packaging Strategy document[8] argues that the strength of the UK system is its cost-effectiveness for producers. Since 1999 it has cost an estimated GBP 900 million (A$1.8 bn) in total, ranging from GBP 42 million (A$84 million) to GBP 141 million (A$242 million) per year according to market conditions. Between 2000 and 2007, it has cost French packaging producers over EUR 2.6 billion (A$4.6 billion) on the household side alone to achieve similar levels of recycling.

The strategy document goes on to say that the UK system's weaknesses are its lack of transparency and revenue predictability, and the fact that where compliance can be achieved mostly through commercial and industrial waste recycling, little funding has made its way to local authorities to help boost packaging recycling from households. And although the document does not make this explicit, it explains why the UK system has been so much cheaper than the French. The French system *only*

addresses household packaging waste, while the UK system only recycles used household packaging where material from commercial and industrial sources is not available.

Another feature of the UK system is that while 'administrative systems' like those in France drive recycling forward as far as is practicable, the PRN/PERN mechanism ensures that producers do just enough to meet the targets but go no further. According to *DEFRA 2009*, the UK's overall packaging recycling rate in 2008 was 61% - 80% for paper & board, 61% for glass, 61% for steel, 35% for aluminium and 24% for plastics. In 2006, 43% of plastics from commercial and industrial sources was recycled, but only 10% from households.

While PRNs work well as a tool for auditing compliance, they have not generated revenues large enough to guide local authority collection policies. Without direct subsidies, sorting is poor, so the packaging material collected is of low quality – a point also made in the strategy document. Some reprocessors have been running a Campaign for Real Recycling to encourage local authorities to improve their collection methods – in particular, the kerbside collection of glass unsorted by colour means that less and less waste glass is going into new bottles and jars (only 41% of the glass packaging recycled in 2008), the rest being used for aggregate. As regards the other materials, "there is no merit in collecting mixed contaminated material which cannot find a market in the UK and then has to be exported for further manual sorting abroad", said the Advisory Committee on Packaging in 2007.

With no direct collection subsidy or Green Dot branding, UK consumers are unaware that industry is providing any funding for recycling. Although Valpak estimated in 2008 that some 60% of all PRN revenue goes to household packaging recycling streams, it is hard to ensure (or prove) that PRN money flows to household waste collection and local councils do not feel that they have benefited.

There have been multi-stakeholder discussions aimed at remedying this (the Packaging Recycling Action Group), but as yet no way has been found to do this within the current market-based approach. Separate recycling targets for household packaging have been suggested, or separate "household PRNs", but it is difficult to see how this could be managed or controlled.

It would be difficult for Valpak or any of the other compliance schemes to decide unilaterally to make a major shift of focus towards the household sector as there is intense price competition between them and schemes taking this step would lose market share. However, some retail chains are now investing heavily in "bring" collection arrangements which are effective but are not necessarily well-coordinated with the kerbside collections organised by the local authority.

The relatively limited role of the UK compliance organisations has created a gap which has partly been filled by the government-funded body, WRAP (the Waste Resources Action Programme). WRAP has taken on activities such as the development of markets for recyclate and a packaging minimisation programme which in other countries are the responsibility of the Green Dot organisations. The Green Dot organisations also run litter abatement programmes, which do not fit into the way the UK compliance organisations operate, and here again some producers are taking voluntary initiatives outside the producer responsibility regulations.

In recent years there has been a growing trend towards exporting paper and plastics packaging waste to the Far East for recycling because of the buoyancy of demand there. The structure of the UK system has reinforced this market trend, which has also created a free-rider problem that does not exist under the conventional European Green Dot model.

Since UK packaging waste collectors get the value of the PERNs if they export packaging waste themselves, but not if they pass it on for reprocessing in the UK, there is a built-in economic incentive

to export, especially when PRN/PERN prices are high. DEFRA data shows how the balance has shifted from PRNs to PERNs (Table 5).

Table 5: PRN and PERN Revenue 1999 to 2005

	GBP millions					
	1999	***2001***	***2002***	***2003***	***2004***	***2005***
PRN revenue	35.0	61.6	100.9	45.3	34.4	59.9
PERN revenue	1.0	8.5	14.2	6.4	11.4	47.2
Total revenue	***36.0***	***70.1***	***115.1***	***51.7***	***45.8***	***107.1***

In 2007 the Advisory Committee on Packaging commented that some 30% of waste packaging was being exported for recycling to markets outside the UK. The majority of packaging material is exported in containers, and as it is not practicable to carry out regular inspections at the point of export, this could well result in over-issuing of PERNs against non-qualifying material. This is not an issue in other European countries, where the legal obligation relates to support of collection earlier in the process.

Lessons for Australia

Australia already has a comprehensive kerbside collection system which achieves good recycling rates for consumer packaging. Its weaknesses are the low quality of some of the material collected, and a need for more to be done to collect containers used away from home. These are problems that the UK shares.

Australia could also do more to collect commercial and industrial packaging, and here the UK has a good record. However, the UK's market-based mechanism cannot distinguish material of household origin and material from other sources, so it would have no value as an add-on to the existing Australian arrangements.

4.3 French Packaging Take-back Scheme

Key features of the French take-back scheme for household packaging are provided in Table 6.

Table 6: Key Features of French Household Packaging Take-back Scheme

First Implemented	1992
What it covers	All packaging of which the final consumers are households.
Funding source and liability point	**Funding source:** Producers and importers of packaged goods. **Liability point:** Producers and importers of packaged goods.

Authorising legislation	Art. R 543-53 – R 543-65 of the Environmental Code *(formerly Decree no. 92-377 of 1 April 1992 on used packaging from households).* Decree 2005-1472 of 29 November 2005 amending Decree 96-1008 of 18 November 1996 on waste management plans for household and similar waste.
Bodies (industry/ NGO/ government) responsible for managing the system	Eco-Emballages and Adelphe collect funds from obligated companies and disburse them to the municipalities. They operate under a renewable six-year approval granted jointly by the Ministers responsible for the environment, economy, industry, agriculture and local government.

Drivers and Scheme Development

Once the German Packaging Ordinance was adopted in 1991, DSD began subsidising the collection of packaging waste from households. The Ordinance required a nationwide collection system to be in place by January 1993, and very soon more material was being collected than German reprocessors could absorb. The surplus was exported to neighbouring countries and since the collection of this material was subsidised whereas the collection of material in the importing countries was not, reprocessors lost interest in paying for or arranging collection of packaging waste generated locally.

Thus from the Government's side, the French Household Packaging Decree was devised to prevent existing collection arrangements from collapsing. Meanwhile much of French industry was concerned that Germany's high plastics recycling targets would be impossible to meet and that plastic packaging would be forced off the market as a result; they were keen to show that a more realistic adaptation of the German law was possible.

From January 1993, France required all producers and importers to contribute to the recovery of packaging waste from households, either by operating a deposit-and-return system, joining an industry-run but government-approved recovery organisation, or setting up its own recovery scheme, which also had to have official approval.

The role of the French recovery organisation for household packaging waste, Eco-Emballages, was to give financial support to the municipalities to help them develop systems for segregated collection and sorting of packaging waste. Operational responsibility remained with the municipalities; brandholders and importers were responsible only for financing the *additional* costs of moving from a system based on disposal to one based on recovery. This was very different from Germany, where industry was expected to take on all packaging waste management costs.

To get funding from Eco-Emballages, municipalities had to submit recovery plans material by material. Eco-Emballages would provide a subsidy per tonne of sorted material delivered for recycling and complying with minimum quality specifications. The level of subsidy was different for each material. Municipalities were offered a choice between a take-back guarantee for the material collected or finding a market for it themselves.

The French Decree set no recycling targets, but targets were specified in Eco-Emballages' operating approval. This envisaged a nationwide packaging waste management system being developed over a period of ten years. Eco-Emballages started by working with highly committed and innovative municipalities on 37 pilot schemes, gradually expanding across the country as it learnt what worked under what conditions and at what cost, before finally tackling the places least cost-effective to service.

394 municipalities, representing 53% of the population, submitted pilot project proposals, and these participated in the early stages of the scheme's development.

The wines and spirits producers set up Adelphe to focus specifically on the collection of glass packaging waste through 'bring' banks. This was partly because as farmers, the wine producers were uncomfortable at joining an organisation run by big grocery companies, but also because they thought that glass could be collected relatively cheaply and so they could charge lower fees than Eco-Emballages. However, Eco-Emballages persuaded the Government that the success of the national recycling programme might be undercut if competitors were allowed to undercut its prices by 'cherry-picking' easy-to-collect materials, so when Adelphe received official operating approval and its prices were announced, they were identical to those of Eco-Emballages. Similarly, the support payments to local authorities were set by the French authorities and were identical for all approved systems.

The European Commission questioned the uniform producer responsibility fees and support payments on competition policy grounds. However, it eventually accepted the French explanation that if one organisation paid more to local authorities, the authorities would move towards the highest contributions, possibly resulting in higher charges to members and hence higher consumer prices.

A third recovery organisation was CYCLAMED, which focused solely on the collection of pharmaceuticals packaging and unused medicines from consumers via the pharmacies. It was approved in 1993, but only for three years (the other organisations were approved for six). To join the scheme, producers and importers of pharmaceuticals paid 0.035% of their annual turnover of pharmaceuticals distributed to pharmacists. Pharmacists and wholesalers were not paid for taking back these containers.

A parallel Decree on non-household packaging waste was adopted in 1994. Here it was felt that no collaborative effort was needed – all that was necessary was to make the market work better by putting a legal obligation on end-users to direct their packaging waste towards recycling and to set up an audit trail to ensure that this was done.

With this structure in place, the advent of the EC Packaging and Packaging Waste Directive made little difference to the French producer responsibility rules. The existing Decrees were left unchanged, but a new Decree on waste management plans for household and similar waste transposed the EU recovery and recycling targets.

Critical Factors Affecting Adoption and Implementation

The Green Dot: Eco-Emballages and Adelphe use the on-pack Green Dot symbol as a branding tool. French industry did not want to devise its own logo as this could have created EU Internal Market problems for products traded across European frontiers. Thus, it approached DSD to license its Green Dot trademark. Some 95% of consumer packaging in France is marked with the Green Dot.

Support payments: Eco-Emballages was the first recovery organisation to negotiate a framework agreement with municipalities. The agreement set out standard rates of support to be paid per tonne collected, with possible additional payments to compensate for long transport distance to recyclers. These payments are made only for household packaging waste collected directly by local authorities or on their behalf by commercial contractors.

Each municipality then agreed an individual six-year contract with Eco-Emballages that set out more precise details of collection arrangements (not all municipalities collected all materials immediately, for example) and levels of support payment.

Since then Eco-Emballages has refined the payment arrangements. After a few years of operation it introduced a bonus system for municipalities achieving high collection yields, both as an incentive and in recognition that achieving high yields is more expensive. It also started paying a specific contribution towards communication costs, paid per capita of local population.

Since 1998 Eco-Emballages has worked on the basis of sharing total costs with the municipalities. In 2005 it adjusted its structure of support payments again, and payments are now differentiated according to collection yield, with top-up payments available for specific demographic situations (rural areas, multi-occupancy housing etc). The support payments made by Eco-Emballages no longer differentiate between collection methods (kerbside versus 'bring').

Support rates are paid for materials sourced from selective collection, and sorted (Table 7 to Table 11). They are graduated for each material at four levels: low, medium, high and extra.

Table 7: Eco-Emballages Support Rates for Plastic Packaging

	Performance (kg per person per annum)	Support (EUR per tonne collected/sorted)	Support (A$ per tonne collected/sorted)
Low	Up to 1.6	310	536
Medium	1.6 – 3.2	575	995
High	3.2 – 8.0	840	1453
Extra	Over 8.0	310	536

Thus a municipality collecting and sorting 400 tonnes of plastic bottles would receive support for 160 tonnes at the low level, 160 tonnes at the medium level and 80 tonnes at the high level.

Table 8: Eco-Emballages Support Rates for Aluminium Packaging

	Performance (kg per person per annum)	Support (EUR per tonne collected/sorted)	Support (A$ per tonne collected/sorted)
Low	Up to 0.1	230	398
Medium	0.1 – 0.2	280	484
High	0.2 – 1.0	330	571
Extra	Over 1.0	230	398

Table 9: Eco-Emballages Support Rates for Steel Packaging

	Performance (kg per person per annum)	Support (EUR per tonne collected/sorted)	Support (A$ per tonne collected/sorted)
Low	Up to 1	45	78
Medium	1 – 2	62.5	108
High	2 – 7	80	138
Extra	Over 7	45	78

Table 10: Eco-Emballages Support Rates for Paper & Board Packaging

	Performance (kg per person per annum)	Support (EUR per tonne collected/sorted)	Support (A$ per tonne collected/sorted)
Low	Up to 4	120	208
Medium	4 – 8	200	346
High	8 – 18	280	484
Extra	Over 18	120	208

These rates are paid only for paper and board complying with agreed quality standards. For material of lower quality, support is paid at 50% of the above rates.

Table 11: Eco-Emballages Support Rates for Mixed Glass Packaging

	Performance (kg per person per annum)	Support (EUR per tonne collected/sorted)	Support (A$ per tonne collected/sorted)
Low	Up to 15	3	5
Medium	15 – 30	5	9
High	30 – 45	7	12
Extra	Over 45	3	5

Clear glass is supported at a rate of EUR 7 (A$12) per tonne.

When a municipality requests it, Eco-Emballages sends in an audit team to assess the effectiveness of the collection arrangements. This team makes recommendations about collection method, frequency, etc. Municipalities can also benchmark their collection costs against those of similar size using software developed by Eco-Emballages. Eco-Emballages makes additional support payments to municipalities that undertake to analyse and improve their collection arrangements. Eco-Emballages comments that it provides a contribution to local government costs, but it will not pay the "political costs" arising from sub-optimal infrastructure decisions.

Eco-Emballages currently pays an average of 56% of "optimised net costs", i.e. the cost of efficient collection as recommended by itself, not whatever collection method the municipality chooses. Net costs are costs less any revenue from the sale of materials. The French environment agency, ADEME, has commented that the average proportion of contributions towards cost hides a wide disparity between the operating costs in different areas, and the funding covers nearly 100% of the cost in the most efficient areas. Eco-Emballages calculates that the cost of segregated collection not covered by its subsidy or by revenue from the sale of materials is EUR 6 (A$10) per person per year.

Eco-Emballages now offers three take-back options for the material collected by local authorities:

- A *full take-back guarantee* in which the material organisations take the material and ensure that it gets recycled. The municipalities get a fixed price for this material. Municipalities currently opt for this arrangement in respect of 100% of glass, and around 70% of paper & board and plastics.
- *Guaranteed take-back* – in which take-back is guaranteed through recyclers, with prices reflecting market prices. This is a more commercial option that exposes municipalities to a higher risk but also ensures that they benefit when market prices are high. In 2007-08 (before the recession), around 30% of paper & board and plastics were handled this way.
- *Take-back without guarantee* – Municipalities find a market for the materials independently with no guarantee offered by Eco-Emballages. Only a very small proportion of material is handled this way in France.

In early 2008, the used packaging materials collected from households were worth EUR 130 million (A$225 million) per annum, one-third of Eco-Emballages' EUR 400 million (A$700 million budget). They are now of course commanding a much lower price.

Key stakeholders:

- The packer/fillers and importers (including retailers in the case of home brands) who provide support funding;

- the take-back guarantor organisations representing the material sectors;
- the municipalities, who are responsible for collection; and
- the environment agency, ADEME, which supervises the system.

Legal Obligations and Free Riders

The legal obligation: Producers and importers must contribute to the recovery of packaging waste from households, either by operating a deposit-and-return system, by joining an industry-run but government-approved recovery organisation, or by setting up its own recovery scheme, which also had to have official approval. There are no deposit schemes and the one individual producer scheme did not apply for re-approval when its original authorisation expired.

The original Decree set no targets, its objectives being embedded into the approval system laid down. Eco-Emballages agreed to achieve 75% recovery by 2003, with material-specific recovery rates of at least 60%. Within the same timescale, Adelphe was aiming for 75% glass recycling and maintenance of the existing 30% market share for refillable beverage containers.

The 1996 Decree on waste management plans for household and similar waste transposed the EU first-stage recovery and recycling targets as they appeared in the text of the Packaging and Packaging Waste Directive, i.e. 50%-65% recovery and 25%-45% recycling by July 2001, with at least 15% recycling of each material.

This was replaced by a 2005 Decree which transposed the second-stage targets: a minimum of 60% recovery and 55% recycling, with at least 60% recycling of glass and paper & board, 50% of metals, 22.5% of plastics and 15% of wood.

Structure of the compliance organisations: In 2005, CYCLAMED was informed by the Environment Ministry that its approval as a recovery organisation for household packaging waste would not be renewed. Unhappy at what they regarded as its poor performance, green and consumer NGOs had been lobbying the French authorities for withdrawal of its approval. Adelphe took over responsibility for recovery operations in the pharmaceutical packaging sector.

After 1997, Adelphe handled all materials from all sectors, but it remained far smaller than Eco-Emballages and its client base did not expand beyond the drinks sector until it took over CYCLAMED's role. With the two organisations providing municipalities with support funding at identical rates, Adelphe was unable to secure enough contracts with municipalities to enable it to collect sufficient packaging waste to meet the targets on behalf of its members. Thus in 2005 Adelphe's operations were merged with those of Eco-Emballages, though it still has its own customer service department for Adelphe members.

Non-packaging paper (including unsolicited mail) and WEEE are now being collected separately. Funding is separate, but Eco-Emballages has offered the new approved organisations the services of its staff specialising in providing support to local authorities (for a fee). The aim is to reduce overhead costs and to communicate together and more effectively with the public.

Eco-Emballages also offers a 'prevention' service in which packaging design specialists assess the packaging used by small companies which do not have the resources or expertise to do this for themselves. Also, the annual data returns have an alert system for packaging codes that have not reduced in weight or by unit during the year. This is intended to encourage companies to take account of eco-design.

Like other Green Dot organisations, Eco-Emballages is involved in litter abatement by working with tourism and leisure operators to provide collection containers at tourist sites and large events.

Other Features

Lead time to implement: Eco-Emballages' original approval gave it ten years to build up to the targets. Its renewed approvals run for six years, which gives it the confidence to plan for the long term.

Free-riding and auditing: Free-riding is always an issue with producer responsibility systems, but Eco-Emballages pioneered some innovative ways of encouraging small companies to join. Companies with a pre-tax turnover less than EUR 305,000 (A$528,000) can pay an annual flat fee rather than making a detailed report on the packaging tonnages they place on the market, and many small companies participate through trade association joint membership arrangements. For example, there are 30 agreements with various regional bee-keepers' associations so that honey producers can pay their Eco-Emballages fees as a surcharge on their insurance payments.

Producers' declaration forms are checked systematically through spot-checks and requests for confirmation by auditors.

Public reporting information: Eco-Emballages publishes detailed annual reports, and key data, consolidated with the Adelphe data, are published on its website.

Complementary measures: Eco-Emballages and ADEME award a quality label to municipalities meeting certain criteria. They must prepare an annual report on the quality and price of public waste management services; ensure that collection rounds are regularly monitored; have a rejection rate of below 25% of whatever materials are collected separately for recycling; must have undertaken a risk assessment; and maintain good health and safety practice for collection operatives. 162 municipalities applied in 2007 and 65 were awarded the label. All applicants received an assessment of their performance with suggestions for improvements.

Successful applicants explained that their motivation in applying for the awards included wanting acknowledgement for the efforts they had made to improve the service, and to persuade their councillors and residents that local collection arrangements were of a good standard. Some also wanted the benefit of external advice and to benchmark their performance against other local authorities.

Eco-Emballages provides support services for Ecosystème, one of the producer responsibility organisations for WEEE, and for Ecofolio, which was set up in response to the 2006 decree on producer responsibility for printed matter (junk mail). The Government is planning to require producers to fund a system for collecting medical waste, mainly syringes, from households. Pharmacies will distribute special containers for used syringes when they fill prescriptions for diabetics.

There is a tax on landfill, which the Government proposes to increase to up to EUR 40 (A$69) per tonne, and a tax on incineration is planned (EUR 5-10, or A$9-17, depending on the efficiency of the plant). Variable charging for collecting waste from households is also under consideration.

Evaluation

The French approach, which learnt from the pioneering German model, proved to be the basic template from which most of the Green Dot systems across Europe evolved (though no two are identical, and Austria and Belgium, in placing total responsibility on industry for the management of packaging waste, relied more on the original German take-back concept). If France had not established its own more realistic model, the EC Packaging and Packaging Waste Directive would have looked very different.

In 2007, the 47,000 companies in membership of Eco-Emballages and Adelphe paid an average of 0.6 euro cents (one Australian cent) per pack. 92.3% of the organisations' income of EUR 411 million (A$711 million) was disbursed to local government to support ten different waste collection systems. Of France's total population of 63.4 million, 42 million have a selective kerbside collection service, 50 million can drop off glass containers at a nearby 'bring' bank and 28 million people have access to a drop-off point either for packaging and newsprint or for packaging only.

The recycling rates Eco-Emballages achieved in 2007 against the targets it had to meet in 2008 under the terms of its approval are provided in Table 12.

Table 12: Eco-Emballages Recycling Rates 2007

	2007 achievement	***2008 target***
Steel	109%	75%
Aluminium	28%	30%
Paper & board	55%	50%
Plastics	21%	21.5%
Glass	75%	65%

These are the recycling rates for *household* packaging, not France's overall packaging recycling rate. In the case of steel, where more packaging was recycled than was placed on the market by Eco-Emballages members, the additional packaging came either from personal imports or from free-riders.

As Table 2 shows, the French producer responsibility system for packaging is considerably cheaper than Germany's though much more expensive than the UK's. However while Germany/France is a like-for-like comparison, UK/France is not, as the British system focuses primarily on business-to-business packaging, which is much cheaper to manage.

At the time Eco-Emballages was set up, environmental awareness in France was very low. It has therefore devoted considerable attention to educational programmes. Environmental awareness has been growing, but packaging has never become a major political issue in France (an indication that the program has been successful).

Lessons for Australia

The fundamental objective of the French Packaging Decrees was to defend the collection arrangements then in place against the fall-out from the German Ordinance and to set up a nationwide system of packaging waste management predicated around recycling rather than disposal.

Australia already has a comprehensive kerbside collection system, and in our view the administrative costs involved in setting up and running a producer responsibility system for packaging in Australia would not add value. If such a system was introduced, though, France would be a useful model in many ways, and in any case the French experience with packaging may be instructive when considering the introduction of producer responsibility for other sectors.

By allowing the producer responsibility organisations time to learn the lessons from pilot schemes before a gradual national roll-out, France avoided the unintended consequences which have been such a problem in Germany. Tough negotiations with the municipalities notwithstanding, the French system has worked remarkably smoothly.

As Eco-Emballages has accumulated experience of what works and what doesn't work in particular situations, it has passed this on to the municipalities. In its 2008 annual report it describes itself as a "think tank and moderator of the debate." In the UK, local authorities have jealously guarded their independence and although they have their own co-ordinating organisation (LARAC, the Local Authority Recycling Advisory Committee) there is very little collaboration with industry. In France, by contrast, Eco-Emballages bought the right to have a say through its consistent financial support and has earned it through the quality of its non-financial support.

In recent months Eco-Emballages has received some adverse publicity due to the loss of a substantial part of its reserves through imprudent investments in overseas tax havens. This was a failure of corporate governance rather than a defect in its operating system; no other Green Dot system has experienced similar problems.

4.4 Swiss Packaging Scheme

Switzerland opted out of the European Economic Area and so does not have to comply with the EC Packaging and Packaging Waste Directive. Swiss legislative requirements apply only to beverage containers.

Key features of the various Swiss sectoral schemes are provided in Table 13.

Table 13: Key Features of the Swiss Beverage Container Recycling System

First Implemented	1990
What it covers	All beverages except milk and milk products.
Funding source and liability point	**Funding source:** Suppliers of empty glass bottles for use in Switzerland, importers of empty or filled glass beverage bottles, and producers and importers of drinks packed in PET bottles or metal cans (and retailers in the case of home-brand products).

	Liability point: Beverage producers, bottlers, importers and distributors. All sales outlets must take back used containers.
Authorising legislation	Beverage Containers Ordinances of 1990 and 2000
Bodies (industry/ NGO/ government) responsible for managing the system	PRS (PET bottles), IGORA (aluminium cans), FERRO Recycling (steel cans) and VetroSwiss (glass bottles) run the system under the supervision of BAFU/OFEC (the environment authority) and UVEK/DETEC (the Department for Environment, Transport, Energy and Communication) IGORA and FERRO Recycling also handle non-beverage metal packaging from households

Drivers and Scheme Development

In 1990, Switzerland adopted a Beverage Containers Ordinance aimed at eliminating PVC containers and ensuring that the steady replacement of refillables by non-refillable beverage containers did not increase pressure on disposal facilities.

It required other containers to be marked as either refillable or recyclable, and specified the maximum tonnage of non-refillable beverage containers which could enter the waste stream. The Ordinance provided for a mandatory deposit on refillable bottles, and mandatory deposits would be applied to non-refillables at the same rates if the waste reduction targets were missed (they were calculated as weight of containers filled or imported minus weight of containers recycled). An adjustment factor was built in to take account of market growth.

The disposal limits for glass and metal containers were not exceeded, but the rapid rise of PET prompted an adjustment, and in 1997 the Ordinance was amended to reduce the landfill limits for glass and aluminium, abolish the limit for tinplate and increase the limit for PET. A new provision imposed a take-back obligation on distributors, manufacturers and importers who supplied non-refillable packaging in PET and aluminium and who did not participate in private recovery organisations. They were now obliged to take back packaging of products in their range and ensure that it was recovered.

The Swiss authorities considered the 1990 Ordinance a great success in that a lower tonnage of beverage containers had become waste since it was introduced, despite a considerable increase in the quantity of beverages sold. Nevertheless, the authorities acknowledged that more flexibility was required to keep pace with market developments, so while the 1990 Ordinance made the imposition of mandatory deposits automatic if the disposal limits were exceeded, this was now made discretionary.

Some cantons[4] wanted a more fundamental change, pushing for the Ordinance to set recycling targets instead of disposal limits fixed in tonnes. Targets are in proportion to the amount of packaging placed on the market, while tonnage limits are absolute. Also, the EU was unhappy with the ban on PVC containers, which excluded drinks made by the dwindling but still significant number of manufacturers using that material.

[4] The 26 states in membership of the Swiss Confederation.

For these reasons, the new Beverage Containers Ordinance adopted in 2000 imposed mandatory deposits on non-refillable PVC as well as on all refillable containers. More significantly, it said that deposits may be imposed on glass, PET or aluminium beverage containers if a material-specific 75% recycling target is not met.

Producers can meet the PET and aluminium targets individually or through a collective system. For glass beverage containers, however, there is an advance disposal fee (ADF) of between CHF 0.02 (A$0.02) and CHF 0.06 (A$0.07), depending on bottle size.

Scheme Development

The tonnage of glass containers landfilled was always comfortably below the limit set by the 1990 Ordinance. When the new Ordinance was under discussion at the end of the decade, however, too many glass users were unwilling to take part in a voluntary system, so an ADF was introduced instead to eliminate any free-riding. It is payable by all suppliers of empty glass beverage bottles for use in Switzerland, and importers of empty or filled glass beverage bottles, unless they are below the *de minimis* threshold.[5] UVEK/ DETEC sets the level of the fee according to the costs of collection and sorting.

The Ordinance said that a private organisation would manage the funds to support the collection, transport, sorting and preparation of these containers for recycling, and for consumer information on this recycling programme, and VetroSwiss was set up to administer the system under a five-year contract with the environment authority. This contract was subsequently renewed to 2011.

A regulation introducing the ADF came into effect on 1 January 2002, involving the rates shown in Table 14.

Table 14: Swiss Glass ADF Rates

Bottle capacity	*CHF*	*A$*
0.09 – 0.33 litre	0.02	0.02
0.33 – 0.60 litre	0.04	0.05
> 0.60 litre	0.06	0.07

Glass recycling has always exceeded the 75% target set by the 2000 Ordinance. The 2007 recycling rate (for all glass containers, not just beverage containers) was 95%.

For the other materials, the affected producers established recovery organisations, IGORA for aluminium, FERRO-Recycling for tinplate and PRS for PET. IGORA handles cans, tubes and pet-food trays and FERRO-Recycling also handles non-beverage steel consumer packaging.

The tonnage of aluminium and steel cans landfilled was always comfortably below the limit set by the 1990 Ordinance, and recycling has always exceeded 75%. The aluminium can recycling rate reached 68% in 1992, and from 2005-7 the recycling rate for aluminium beverage cans, sauce tubes and food

[5] The ADF is not payable by suppliers and importers of beverage containers with a capacity of less than 0.09 litres, or those who supply or import fewer than 1,000 beverage containers per half calendar year. Companies are reimbursed if they export containers on which a fee has already been paid.

and pet food containers and trays has been consistent at 90%. For steel, the 2008 recycling rate was 79%.[6]

PET was the one material which did not quite reach its 75% recycling target. In 2003, for example, only 71% of PET was recycled. Members of PRS, which then represented around 85% of the market for PET, achieved 76%, but other producers, with individual compliance arrangements, achieved only 47%.

Each year when the environment authority announced program results, it indicated that it would be considering imposing a mandatory deposit for PET. However, in 2005 the environment authority announced that it would not be recommending a deposit for PET, although PET had again narrowly failed to meet the target, achieving 74%.

The main reason for the shortfall was a relatively low recycling rate for the 0.5 litre PET bottle. A study jointly commissioned by the environment authority, PRS and IGORA concluded that a deposit of CHF 0.50 (A$0.57) on small PET bottles would solve the free-rider problem and achieve a recycling rate of between 75% and 84%. However,

- a deposit on small bottles but not on large ones would be complicated for businesses and consumers;
- there would be additional costs of CHF 0.8 - 0.16 (A$0.91 – 1.82) per deposit bottle to fund the return system (refund and logistics). Most of this would be met through unredeemed deposits, but a fee of up to CHF 0.05 (A$0.06) per bottle could be necessary, depending on the return rate achieved; and
- a deposit would not solve the litter problem because small PET bottles represent a small proportion of total litter, and diversion of PET from the universal 'bring' collection system for lightweight packaging could have an adverse effect on collection rates for aluminium cans.

If further action was needed to ensure that all distributors contribute to PET recycling, said the environment authority, it might propose an ADF rather than a deposit, along similar lines to the ADF for glass. This would have ruled out individual compliance. The authority was concerned that the voluntary funding arrangement for PET recycling was under threat, due to some PRS members threatening to leave, angered by the continuing high level of free-riding.

PRS argued that the recycling rate was steadily increasing. The number of collection containers had greatly increased in recent years, particularly in leisure sites, schools, hospitals etc.; 20% of the target now came from PET collected through these voluntary containers. PRS also said that it was negotiating with free-riders to bring them into membership. Nonetheless, it expressed concern that 'foreign hard discounters' were unwilling to participate.

The threat of an ADF seems to have had some effect. Two major discount chains joined PRS in January 2007, which meant that it now covered 95% rather than 85% of the market. From the same date, PRS reduced its participation fee from CHF 0.04 (A$0.05) to CHF 0.018 (A$0.02) per container. This was possible not only because membership income had increased, but also because market prices for secondary PET were high. The reduced fee was expected to make membership of PRS more

[6] Though this was 4% lower than in 2007.

attractive to those operators which remained outside it. Then the environment authority confirmed that it no longer planned to introduce an ADF for PET because the funding of the recycling system PRS had "stabilised".

The PET recycling rate continues to rise slowly but steadily. In 2007 it was 78%, with PRS achieving 83% on behalf of its members.

Critical Factors Affecting Adoption and Implementation

Logistics: Collection relies entirely on 'bring' containers for all materials. There are 'bring' banks for aluminium cans in almost all of the country's 3000 local authorities, and IGORA supplies branded collection bins (8,500 of them with a can-crushing facility) and collection bags free of charge to snack bars, cinemas, mountain huts, etc. FERRO Recycling operates a network of 4,000 'bring' containers throughout Switzerland.

IGORA and FERRO Recycling encourage local authorities to collect both metals together in the same container because it saves money and improves collection yields by being convenient for consumers. The amount paid is the same regardless of whether the metals are collected mixed or separately. The material is then sorted in one of 17 plants in Switzerland.

Non-refillable PET bottles are collected in some 42,000 'bring' containers, one for every 180 people:

- close to half (20,000) are boxes in offices and canteens;
- retailers are obliged to provide collection points, and in small villages where there are no shops, there are public collection points;
- PRS estimates that 40% of PET bottles are consumed away-from-home, and there is an intensive network of collection points at leisure facilities, petrol stations, schools, building sites, take-away outlets and railway stations. Information campaigns have focused on 'on-the-move' consumption.

Voluntary permanent collection sites can register with PRS online to receive branded collection bins (which they must pay for) or sacks, which are delivered free of charge. The bottles are picked up by a PRS contractor free of charge when at least five sacks have been filled.

PRS and IGORA invite organisers of music, sporting or community events to contact them in advance, supplying them with free bins and bags and picking up the empties free of charge.

Funding: Local authorities and other collectors of glass are paid from the ADF revenues for each tonne of colour-separated glass made available for recycling. Payment for mixed cullet is at a lower rate. CHF 1 million (A$1.14 million) is also made available to provide a 50% or 75% grant for the purchase of collection containers by municipalities with a low per capita tax liability.

The IGORA system is funded by a fee of CHF 0.01 (A$0.01) per can (the fee was CHF 0.03 in 2004, but was subsequently reduced by CHF 0.005 per year until it reached its present level in 2008). Food tubes and trays are also charged at CHF 0.01 (A$0.01) per unit. The charges cover about half the collection costs; the aluminium industry pays the rest.

In 2006, IGORA's payments to the local authorities were increased from CHF 60 (A$68) to CHF 80 (A$91) per tonne, to reflect the higher scrap value of aluminium, and in 2008 it was increased again to CHF 100 (A$114) per tonne. Collectors (including individuals) receive CHF 13 (A$15) per 10 kg, plus the scrap value, and the possibility of higher rewards through a lottery scheme. IGORA handles cans from retailers which have not joined the scheme.

FERRO Recycling is funded by a voluntary contribution of CHF 0.01 (A$0.01) per can from producers and importers. The contribution for catering-size cans (above 1.5 litres and up to 5 litres) is CHF 0.02 (A$0.02).

FERRO Recycling makes a contribution of CHF 100 (A$114) per tonne to fund part of the cost of transporting the cans to the preparation plant (where the cans are sorted). FERRO Recycling picks up all the cost from there. For steel, unlike aluminium, there is no buy-back arrangement for individual end-users.

PRS pays local authorities for the PET they collect, subject to certain conditions: the site must be manned and accessible to the public, and the material must meet quality specifications (unsupervised sites have a much higher level of contamination). Producers and wholesalers are no longer paid for collecting PET, as a trade-off for the lower PRS fees they are now charged.

Hauliers contracted by PRS take bottles to one of five depots, but large retailers organise their own transport. PRS funds 50% of the cost of containers, and funds transport from local authority sites.

Key stakeholders: Suppliers of empty glass beverage bottles for use in Switzerland and all importers of empty or filled glass beverage bottles pay the ADF, the revenues from which are managed by Vetroswiss.

IGORA's membership consists of 8 beverage fillers, 5 companies from the aluminium industry and 14 associates. The members of FERRO Recycling are producers, importers and distributors of steel food and beverage cans and disposal contractors.

Producers, bottlers, importers and distributors of drinks packed in PET are members of PRS. PET recyclers are excluded from membership for competition policy reasons.

Legal Obligations and Free Riders

According to the Beverage Containers Ordinance of 2000, beverages may be supplied only in containers which, when collected, treated or recovered by existing organisations, do not give rise to significant additional costs or significant technical difficulties.

There is a mandatory deposit of at least CHF 0.30 (A$0.03) on refillable containers, except when supplied to restaurants which ensure that the containers are collected, or for products delivered direct to consumers' homes, if an amount equivalent to the deposit is charged for any refillable containers not returned. There is a similar deposit on non-refillable PVC containers (but again with an exemption for restaurateurs who ensure that non-refillable PVC containers are collected).

Distributors, manufacturers and importers who supply beverages in non-refillable PET or metal containers to consumers and which are not members of the appropriate recovery organisation must take containers back at point of sale and, at their own expense, send them for recovery. This obligation applies to all beverage containers, not only those of the brands they sell. At all points of sale there must be a clearly visible notice of this take-back facility.

There are material-specific recycling targets for PET, glass and aluminium. Each material must achieve a 75% recycling rate.

If these targets are not achieved, the authorities may impose a mandatory deposit and/or impose an obligation on suppliers to take back and ensure the recovery of the containers. UVEK/DETEC may limit the mandatory deposit to those containers that are the main cause for the recycling target not being met. It may grant exemptions from the mandatory deposit if the recovery of the containers is guaranteed in other ways.

If distributors, manufacturers and importers supply annually more than 100 tonnes of recyclable non-refillable containers of a packaging material other than glass, PET, aluminium or PVC, then UVEK/DETEC may also establish a minimum recycling target and similar sanctions for this material.

Suppliers of empty glass beverage bottles for use in Switzerland, and importers of empty or filled glass beverage bottles, must pay an ADF. The aim is to reduce the costs to local authorities of collecting and managing recyclable materials.

Free-riding: The glass users were unwilling to commit to a voluntary scheme, and instead had an ADF imposed. Importers pay the ADF via the customs authorities, which is a considerable help in minimising free-riding.

The metal packaging sectors are relatively concentrated, and free-riding has not been seen as a problem.

With 97% of relevant companies now covered, PRS says that the problem of free-riders has been largely resolved

Other Features

Lead time to implement: The Beverage Container Ordinance of 2000 allowed six months to meet the recycling targets (which were already being met for all materials except PET). 18 months elapsed before the ADF for glass came into effect.

Auditing: SVUG (the Association for Environmentally Sustainable Beverage Packaging) produces market data on behalf of the environmental authority. SVUG's members are the beverage producers, PRS and IGORA. These data are relatively easy to check against the data submitted to the recovery organisations in respect of the fees payable, as fees are paid per unit and there are not many companies involved.

Public reporting information: The environment authority and the sectoral organisations all report annually on progress.

Complementary measures: Broader producer responsibility requirements have been under discussion for some years. It was intended that an ADF would be introduced for paper packaging once the effectiveness of the system for glass had been tested. However, plans to include paper in the arrangements were suspended. When waste paper prices rose, pressure to legislate was reduced, and in 2006 a framework voluntary agreement was concluded under which collectors guarantee to pay local authorities a minimum amount for the waste paper they collect from households and to take all the paper collected, provided that it meets an agreed quality specification.

The framework agreement establishes basic conditions, and it is up to each municipality to conclude a contract with a waste paper collector. The agreement involves some element of risk for the contractors but in exchange they get improved security of supply. Through the agreement, contractors offer a contract to any interested municipality to take all the waste paper the municipality collects, and to ensure that the paper is recycled within Switzerland wherever possible. They must pay the municipality at least the rates shown in Table 15.

Table 15: Minimum Paper Rates for Swiss Municipalities

	CHF per tonne	*EUR per tonne*
Mixed paper/board (max. 30% board):		
Up to 1,000 tonnes per year	10	6.20
1,000 tonnes or more per year	20	12.40
Paper only:		
Up to 1,000 tonnes per year	40	24.80
1,000 tonnes or more per year	50	31.00

The landfilling of combustible municipal waste has been banned since 2000 (though this was not fully enforced until 2004 when further incineration capacity was added to make alternative treatment feasible).

A federal tax on landfill sites came into effect in 2001. It applies both to household and non-household waste, and is levied at a maximum of 20% of landfill disposal cost. Waste exported to other landfills is taxed at the rate that would have been charged in Switzerland. The revenues from the tax are used to contribute up to 40% of the cost of cleaning up sites where the polluter is not known or where most of the contamination is caused by municipal waste (the remaining 60% is paid by the cantons). When it was introduced, the landfill tax was expected to increase landfill costs by CHF 4 (A$4.56) per inhabitant per year.

Evaluation

The systems rely entirely on a dense network of 'bring' collection containers for all the materials. The organisations responsible for the lightweight materials make it convenient for consumers to take their used packaging to the nearest collection point by supplying them with collection bags (for PET or aluminium) and boxes (for steel packaging).

The sectoral organisations all run large-scale communications programmes to encourage consumer participation, and they all co-operate on an anti-litter programme. Collection is further incentivised by buy-back schemes.

Lessons for Australia

The Swiss system challenges the widely-held view that a container deposit system (CDS) is the only way to achieve a high recycling rate for beverage containers. Swiss beverage container recycling rates are comparable with those in Sweden, where the deposit system achieves a return rate of 85% for cans and PET, and Norway where the rates are 90% for cans and 81% for PET. The Swiss have achieved this by making collection containers available and convenient for everyone – at work, at play, on the move or close to home.

It may be argued that this is possible because the Swiss are inherently well-organised. However, some 20% of the population are immigrants, many of them not fluent in the local languages, and there are a great number of foreign tourists.

5.0 Industry Funding Organization - Stewardship Ontario

Stewardship Ontario is Ontario, Canada's, first not-for-profit Industry Funding Organization (IFO) and the means for industry 'stewards' to fund the collection and recycling of commingled recyclables in Ontario's Blue Box program, as well as Municipal Hazardous or Special Waste (MHSW, detailed below). Key features of Stewardship Ontario are provided in Table 16.[9] As Stewardship Ontario is responsible primarily for funding, a variety of other issues in MS2 and Perchards' analytical framework are not readily applicable to this program.

Table 16: Key Features of Stewardship Ontario

First Implemented	November 2002
What it covers	Commingled recyclables in the Blue Box program, plus Phase 1 and Phase 2 MHSW (see below).
Funding source and liability point	Industry stewards designated by Ontario's Minister of the Environment as being responsible for funding product stewardship/EPR programs for products designated by the Minister.
Authorising legislation	*Waste Diversion Act 2002* (WDA), plus approval by the Minister of the Environment. Ontario's Minister of the Environment defines by regulation products to be subject to product stewardship or EPR. The Minister's requests to Waste Diversion Ontario specify minimum program requirements, obligated stewards, costs to be addressed and other key program features. Affected stewards establish an IFO that, once approved by the Minister, has powers to compel stewards to report and pay fees. Ontario Regulation 273/02, amended by Ontario Regulation 255/06, designated Stewardship Ontario as the IFO for Blue Box materials. Ontario Regulation 542/06 designated Stewardship Ontario as the IFO for MHSW materials.

Bodies (industry/ NGO/ government) responsible for managing the system	Waste Diversion Ontario Stewardship Ontario

Drivers and Scheme Development

The Beverage Container Regulations of 1976 aimed at limiting the development of non-refillables, but this proved impracticable. New regulations were adopted in 1985, and these required each type of non-refillable container to meet a target of 50% recycling within three years. In response, the Ontario Multi-Material Recycling Incorporated (OMMRI) was founded in 1986 to manage industry's contribution to the world's first kerbside collection system. OMMRI committed C$20 million (then roughly A$20 million also) towards the purchase of collection and sorting equipment, for provision of the Blue Boxes used by householders to collect their recyclables and for publicity. OMMRI also provided technical advice on collection systems and helped market the reclaimed materials.

In recognition of industry's efforts, the Provincial Government agreed to redefine the 50% target as 50% of the material going into householders' Blue Boxes, with material passing through vending machines and small shops being excluded from the calculation. After all, OMMRI had argued, industry was the only sector whose performance was being measured, so it was reasonable to measure that performance only on the basis of what industry had put in place.

By 1989, OMMRI's initial mandate had been achieved and it was challenged by the government to broaden its membership and increase its involvement. This resulted in the formation of OMMRI II, which involved publishers, printers, grocery products manufacturers, plastic products manufacturers, and packaging manufacturers as well as the soft drink industry, and in 1990 a Memorandum of Understanding was signed between the Ontario government and OMMRI II to establish a cooperative arrangement to help develop and expand the Blue Box program. OMMRI II agreed to provide funding to cover at least one-third of the capital cost of developing a provincial-wide infrastructure. Its members also provided other funding to assist in promoting, launching and expanding activities. By the end of 1995 OMMRI II had provided an additional C$25 million. At this stage, over 85% of the province had access to the Blue Box program and OMMRI II's mandate had been completed.

The assumption was that the province would pass level playing field regulations, which it did not. Therefore OMMRI II could not meet its funding objectives. Voluntary contributions were received from less than half of the companies in the designated sectors. Thus in June 1996 OMMRI II was dissolved and the various stakeholders (excluding the newspaper publishers) formed Corporations Supporting Recycling (CSR). In its new role, CSR was to work with the various provincial governments to develop recycling as a sustainable and economically viable component of an integrated waste management system. CSR was also to represent members in discussions and negotiations related to stewardship of their products and packaging.

Meanwhile a one-year voluntary agreement signed in 1999 between representatives of the various governmental bodies in Ontario and a number of business organisations committed all participants to waste reduction and the protection of the environment. The key objectives were to evaluate and

implement residential waste diversion programs in support of the provincial government's 50% diversion target, identify options for a funding formula to support a sustainable residential waste management system; and recommend how to provide ongoing support to municipalities so they continuously improve the effectiveness of their waste diversion programs.

In 2001, a Bill to create a permanent waste diversion organisation called Waste Diversion Ontario (WDO) and to provide a level playing field was introduced by the Minister of the Environment and supported by a wide group of stakeholders. This became the Waste Diversion Act.

Sections 23 and 24 of the *Waste Diversion Act 2002* (WDA) authorised the Minister of the Environment to develop waste diversion programs for a given "designated waste" in conjunction with an IFO. Once designated wastes are specified by the Minister, affected industry stewards are required to develop specific program plans on behalf of WDO in consultation with key stakeholders in order to develop detailed programs that address accessibility, reuse, collection and recycling. The program plans and IFOs are approved by the Minister, with Ministerial approval providing powers to compel stewards to report and pay fees through the IFO.

In a request letter from the Minister in September 2002 and by way of accompanying regulation, "Blue Box waste" (commingled recyclables) became the first waste designated under the WDA, with WDO tasked with program development in conjunction with an IFO. Stewardship Ontario applied for incorporation as a not-for-profit IFO in November 2002. The Blue Box program plan was approved by the Minister in December 2003 and commenced February 2004. Since then, Stewardship Ontario has funded half of Ontario's municipal Blue Box collections.

In December 2006, through a similar process (request letter and accompanying regulation) the Minister required WDO, in conjunction with Stewardship Ontario, to develop a waste diversion program for Phase 1 MHSW. WDO submitted the program plan in May 2007 and made a variety of revisions in November 2007. The Phase 1 MHSW program, which was approved by the Minister in February 2008 and commenced in July 2008, includes[10]:

- Paints and coatings, and their containers;
- Solvent, and solvent containers;
- Oil filters, after they have been used for their intended purpose;
- Containers with a capacity of 30 litres or less manufactured and used for the purpose of containing lubricating oil;
- Single use dry cell batteries (Section 6.2);
- Antifreeze and antifreeze containers;
- Pressurised containers such as propane tanks and cylinders; and
- Fertilizers, fungicides, herbicides, insecticides, or pesticides and their containers.

The Phase 1 MHSW program aims to divert an average of 32,000 tonnes p.a. of waste over the next five years. Examples of targets specified for these materials are provided in Table 17.

Table 17: Select Collection and Diversion Targets for Phase 1 MHSW Materials

Phase 1 Materials		2007 Baseline	Year 1	Year 2	Year 3	Year 4	Year 5
Paint & coatings	Collection	51%	53%	55%	57%	59%	61%
	Diversion	44%	46%	48%	50%	51%	53%
Solvent	Collection	35%	37%	39%	41%	43%	45%
	Diversion	-	-	-	10%	10%	10%
Oil filters	Collection	38%	65%	74%	78%	81%	84%
	Diversion	35%	60%	69%	73%	75%	78%
Oil containers	Collection	6%	30%	35%	40%	45%	50%
	Diversion	3%	15%	28%	40%	45%	50%
Single use dry cell batteries	Collection	5%	6%	7%	10%	15%	25%
	Diversion	0.5%	1%	2%	4%	7%	13%
Antifreeze	Collection	16%	25%	35%	40%	45%	50%
	Diversion	15%	24%	33%	38%	43%	47%

(Source: Gies 2008)

In July 2008, the Minister requested WDO to proceed with the next phases of the MHSW program in conjunction with Stewardship Ontario and to make a number of substantial modifications to the Phase 1 MHSW program plan. Specifically, the Minister required EPR for stewards to bear the full costs of management, from collection through to final diversion or disposal (stewards were previously responsible only for post-collection costs). A range of collection options were to be considered to increase consumer convenience and access. The program was also required to include certain wastes from industrial, commercial and institutional (IC & I) sources, as these wastes were not commonly diverted from disposal and were generally indistinguishable from residential sources for the same materials.

In the July 2008 modifications, the Minister also specified Phase 2 MHSW wastes as:

- All batteries (excluding lead acid batteries from vehicles) from residential and IC & I generators;
- Aerosol containers, portable fire extinguishers, fluorescent light bulbs and tubes (limited to generators of no more than 5kg/month), mercury-containing switches and mercury-containing measuring devices, all from residential and IC & I generators; and
- Pharmaceuticals and sharps, including syringes, from residential generators only.

All other MHSW materials were set aside for inclusion in Phase 3. After an agreed delay (from March 2009 to July 2009), the Minister agreed to receive a single consolidated MHSW program plan. In May 2009, a draft consolidated plan for MHSW[11] was released. If approved by WDO and the Minister, this plan would replace the existing Phase 1 MHSW program plan and guide future efforts.

Other Features

Auditing and enforcement: Stewardship Ontario annually conducts random audits of stewards representing at least 10% of obligated tonnage under the Blue Box program. In 2008, Stewardship Ontario audited 34 stewards representing 135,000 tonnes of Blue Box materials.

Public reporting information: Section 22 of the WDA requires WDO to prepare and make public an annual report from April 2004 and annually thereafter. Section 33 of the WDA requires the designated IFOs for each waste diversion program (including Stewardship Ontario) to submit annual reports no later than 1 April each year; these reports are posted when received by the WDO Board of Directors. Information on Stewardship Ontario is available at www.stewardshipontario.ca.

Evaluation[12]

Blue Box: As of December 2008, 4,235 stewards were registered with Stewardship Ontario. Of those, 1,951 were obligated to report as Blue Box stewards and responsible for over C$69 million (A$80 million) in steward fees for the Blue Box program in 2008. Around 5 million households in Ontario have access to Blue Box recycling services and 90% of residents report participating in recycling, where available.

Since commencing, Stewardship Ontario has distributed more than C$229 million (A$266 million) to municipal recycling programs in Ontario, including C$51.7 million (A$60 million) in 2008 alone. Daily and community newspapers provided an additional C$7.8 million (A$9 million) in in-kind advertising to promote recycling of Blue Box materials.

As of 2008, 20% of Blue Box stewards' annual funds are set aside in a Continuous Improvement Fund (CIF) for grants and loans for municipal projects aimed at increasing the efficiency and effectiveness of residential recycling.

In addition to funding for municipal programs, Stewardship Ontario has funded complementary efforts such as market development for recovered materials and consumer awareness campaigns. These efforts include C$2.8 million (A$3.2 million) for investment in glass market development initiatives (contributing to development of three new processing facilities with a throughput of over 150,000 tonnes of mixed broken glass) and plastics market development funding in 2008 of C$2.4 million (around A$2.8 million).

Province-wide, Ontario's diversion rate from landfill of Blue Box materials has increased from 53% in 2004 when the program took effect to 63% in 2008. Stewardship Ontario notes that the provincial target of 60% recovery was exceeded in 2007 and 2008 despite the growth in new products which may be in packaging that is difficult to recycle.

Phase 1 MHSW: During the first six months of the Phase 1 MHSW program (July to December 2008), Stewardship Ontario registered 320 MHSW stewards and entered into:

- Shared Responsibility Agreements with 103 municipalities;
- a collection and backhaul contract for paints and coatings from 73 Rona stores;
- a collection contract for paints, coatings and single use batteries from 81 Home Depot stores; and

- collection contracts for oil filters, antifreeze and oil covering 40 Jiffy Lube sites (where do-it-yourself oil changers can drop off used oil) and 12 Pro Oil Change sites.

Stewardship Ontario has also entered into several contracts from processing the materials collected from these arrangements. During the first six months of the MHSW program, Stewardship Ontario also registered 320 stewards and implemented funding and reporting requirements for those stewards. These MHSW stewards were responsible for around C$28 million (A$33 million) in stewards fees.[13]

Stewardship Ontario indicates that at less than 4% of stewards' funds collected, administrative costs are lower than any comparable program in Canada.

Lessons for Australia

Blue Box: One early criticism (including by the authors) of Stewardship Ontario's commitment to fund half of the cost of municipal recycling programs was that cost containment measures included in the original program plan were not seen as effective. As a result, there was extensive debate around the actual costs of local government recycling programs, rather than seeking to minimise those costs. In 2004, Stewardship Ontario conducted broad stakeholder engagement and discussions to develop and implement improved cost containment approaches.

Another early criticism of the program was that Stewardship Ontario was focused on funding to the exclusion of actual recovery efforts. However, over time, Stewardship Ontario progressively imposed greater standards and a range of efforts addressing not only collection, but also processing and end use markets. In 2007, Ontario's Blue Box recycling rate was 64%, while Australia's packaging recycling rate was 56%[14]. Although the recycling rates are not directly comparable, it could be argued that Ontario has taken a more comprehensive approach to funding over time than has Australia. Funding under the original National Packaging Covenant was focused solely on kerbside collections, while the revised Covenant that took effect July 2005 resulted in a broader funding mix focused on achieving the Covenant's target of a 65% packaging recycling rate by 2010. Still, there is room for improvement in Australia for funding markets for both primary ('closed loop') and secondary (alternative use) markets.

In late 2005, Stewardship Ontario commenced a multi-stakeholder process to revisit the process for establishing and assessing stewards' fees that was ultimately approved by the Minister and applied to the 2007 and 2008 fee calculations[15]. Opening up the process to allow for greater stakeholder input into the fee structure in a transparent manner should ultimately promote greater engagement of the affected parties and improve compliance and enforcement.

Phase 1 MHSW: It is important to note that adoption and implementation of the Phase 1 MHSW (and to a lesser extent the Blue Box program) has involved close consultation and cooperation with affected stakeholders throughout the entire process. As a result, Ontario has avoided most of the delay tactics seen in other jurisdictions and been able to progress efforts in a more cooperative manner. In the absence of specific information about program development, stakeholders often imagine the worst possible consequences and focus on fighting against program introduction. Ontario has been able to get on with material collection and recycling through a more collaborative approach.

6.0 Belgian and Canadian Battery Programs

Ontario is the first North American jurisdiction to require a producer responsibility program for batteries, and has integrated battery collections with a range of programmes for household wastes[16]. The Belgian battery scheme, which predates the Ontario scheme by a decade, has focused on developing an extensive collection network.

6.1 Belgian Battery Take-back Scheme

Key features of the Belgian BEBAT battery take-back scheme are provided in Table 18.

Table 18: Key Features of BEBAT

First Implemented	1995 (establishment of scheme)
What it covers	Portable batteries and accumulators (capacitors)
Funding source and liability point	**Funding source:** Battery producers and importers **Liability point:** Battery producers and importers are responsible for collection and recycling of an amount of waste batteries corresponding to 40% of batteries sold by weight in 1996 and 65% since 2004.
Authorising legislation	BEBAT's regulatory frame can be split into three levels: An *Eco-Tax Law* of 1993 imposed an excise tax on batteries at a rate of EUR 0.50 (A$0.87) per battery sold. The tax has never been collected as the Finance Ministry awards a temporary eco-tax exemption to battery producers and importers that are members of an agreed scheme that achieves certain annual collection and recycling targets. Waste legislation (including producer responsibility on waste products) is a regional responsibility: Flanders introduced a *producer responsibility decree* for waste batteries in 1996, Wallonia in 2002 and the Brussels region in 2001. Currently these decrees have only partly been aligned with the EU Batteries Directive 2006/66/EC. Each regional Decree is complemented by an *Environmental Agreement* between the regional government and battery producers/importers' associations. This agreement stipulates operational details for batteries management scheme BEBAT.
Bodies (industry/ NGO/ government) responsible for managing the system	Battery producers and importers established the collective system BEBAT (Fund for the Collection of Batteries) as a not for profit organisation to obtain exemption from the eco-tax. BEBAT is financed by a fee – set by the Government - of EUR 0.1239 (A$0.21) per battery put on the market, about a quarter of the ecotax. Around 1,300 battery producers and importers are registered with BEBAT.

Drivers and Scheme Development

A legal debate on how to regulate the use, collection and recycling of batteries in order to minimise pollution led to voluntary agreements between the Belgian battery industry and the government in 1988 and 1990 that aimed at reducing or eliminating mercury content in batteries. These did not reduce the share of mercury-containing batteries, which grew to 95% in 1995.

As part of the general eco-tax law of 1993 (which emerged as part of a political deal required by the Green parties as a condition for supporting the majority in Parliament), an excise tax was imposed on all batteries sold at a rate of EUR 0.50 (A$0.87) per battery. The tax allowed batteries to be exempted if they were part of a deposit system with a deposit of not less than EUR 0.25 (A$0.43) per battery or if they were used for industrial purposes (e.g. requiring handling by qualified personnel).

However, enactment of the 1993 eco-tax law was deferred to January 1996 due to implementation difficulties, and government and industry began discussing a voluntary agreement.

Under threat of the implementation of the eco-tax, industry accepted the inclusion of all portable batteries (not only those containing mercury) under a new voluntary agreement, and in August 1995 set up not for profit organisation BEBAT a.s.b.l. to organise battery collection and treatment. BEBAT became operational in January 1996. The agreement with the three regional environment agencies regulating BEBAT's operations was signed in June 1997.

In parallel to these developments, the 1996 amendment of the eco-tax law extended the scope of the tax to rechargeable batteries and introduced the option of a tax exemption for batteries recovered through a collection and recycling system. This system had to be funded by a levy of EUR 0.10 (A$0.17) – since 1999 EUR 0.1239 (A$0.21) – excl. VAT per battery sold. It had to reach annual collection targets (40% in 1996 increasing to 75% in 2000), treat and recycle all collected batteries using the latest technology which is "economically achievable" and ensure that producers provide relevant information to the authorities, including how they inform consumers about the system.

The 2002 amendment of the eco-tax stipulated that if a collection target was not reached, a fine would be payable for each battery below the target equal to the eco-tax plus a recycling fee. As the 75% target was not reached in 2000-1, the 2003 amendment reduced the collection target to 60% for 2002, 62.5% in 2003 and 65% in 2004 and thereafter.

Producer responsibility decrees (using as an example Flanders' Waste Prevention and Management Decree, VLAREA)

Each of the three Belgian regions has its own environmental law and regulations. Producer responsibility decrees of each region formalised the legal obligations of individual producers. The VLAREA's 2004 amendment raised the *recycling* target for portable batteries to 65% (and introduced a minimum *collection* target of 90% for starter batteries). It also required retailers to take back batteries from consumers even if no new batteries were purchased, and producers/ importers had to take back containers and collected batteries free of charge on request from retailers.

Critical Factors Affecting Adoption and Implementation

Logistics: BEBAT originally planned to set up 600 collection facilities for batteries. The Belgian electronic and electrical producers' federation FEE argued that this was insufficient and inconvenient for consumers and in 1996 BEBAT began placing its collection containers in shops, quickly increasing the number of battery collection points to 10,000. This move was later supported by a producer responsibility decree in Flanders which required retailers to take back waste batteries from consumers free of charge. Currently there are about 20,000 collection points throughout Belgium, and 2,500 in Brussels alone. 20% of the locations collect 80% of the batteries.

29% of waste batteries are collected by industry (including batteries removed from WEEE collected by WEEE system Recupel), 25% are collected in schools, 24% at municipal collection facilities, 17% at retailers and 5% from miscellaneous other collections.

Key stakeholders:

- The Belgian electronic and electrical producers' federation, FEE;
- The Regional Environment Agencies;
- The Federal Government; and
- retailers

Legal Obligations and Free Riders

The legal obligation: Flanders' *VLAREA* Decree of 1998 made *producers* responsible for reaching the collection target of 75% and introduced a recycling target of 50%. Producers (de facto through BEBAT) had to report annually to the regional Environment Agency (OVAM) the weight of batteries and accumulators sold, collected, treated, recycled in the Flemish Region for each battery category (zinc manganese oxide, alkali manganese, silver oxide, mercuric oxide, zinc air, nickel cadmium, lead starter and other batteries).

Retailers were required to take back, free of charge, waste batteries returned by consumers and show a sign on their premises indicating this service.

Distributors had to take back batteries from retailers and hand them to importers or battery manufacturers who had to take the collected batteries to a registered treatment facility.

Free-riding and the structure of the compliance organisations: Due to the BEBAT fee being widely perceived as a tax, it is estimated that there is only a small number of 'free riders', consisting mainly of small South East Asian brands that are enclosed in toys and watches.

BEBAT has a staff of 6 and around 1,300 battery producers and importers as members.

Other Features

Lead time to implement: It took seven years (from around 1990 to 1996) for the formalisation of a voluntary agreement governing BEBAT that in its main points is still in place today, and another five years (from 1996 to 2001) for BEBAT's collection to reach its present level of around 50% (by weight) of batteries placed on the market.

Auditing and enforcement: Enforcement of the producer responsibility obligations is facilitated by the clear sanctions under the eco-tax law. When a company joins BEBAT, the Finance Ministry awards a temporary eco-tax exemption conditional upon achievement of the annual collection target. For monitoring purposes, BEBAT is required to provide information to the Ecotax Commission, the regional governments and the federal government at fixed intervals. Following an annual report, the Ecotax Commission advises the governments on whether to allow the voluntary agreement to continue.

If the prescribed percentage for any year is not reached, all sold batteries would become subject to the ecotax the following year and BEBAT would be fined.

Public reporting information: BEBAT's annual budget for awareness creation campaigns is around EUR 5 million (A$8.65 million), or one-third of revenues. The BEBAT brand has obtained a high profile by the placement of boxes in shops and public places, as well as TV and radio based awareness campaigns, lotteries, games and contests. A June 1999 survey indicated that 81% of the population claimed to collect batteries separately (46% did so in 1996), and 86% were aware of the in-store collection boxes. Only 13% admitted to throwing their spent batteries into the dustbin.

Evaluation

Collection: Since 2001, the amount of waste batteries collected has remained at 230-240g per capita per annum or around 50% of batteries placed on the market by weight. This is higher than in other member states (Germany and Austria collect around 180-200g per capita per annum). That the 50% level is difficult to exceed, despite intensified media campaigns, may be due to consumers' tendency to store old batteries and equipment containing batteries at home rather than disposing of them.

Financing: Only collection volumes are made public, financial data are not. BEBAT reported losses from 1997 to 1999, but it can be assumed that it has had ample financing in more recent years. Its revenue in 2006 was EUR 18.2 million (A$31.5 million) – a figure arrived at by multiplying 147,000,000 batteries put on the market in that year (13 batteries per capita) with BEBAT's fee of EUR 0.1239 (A$0.21) per battery put on the market. Our calculations suggests that BEBAT's revenues per tonne of waste batteries collected increased from around EUR 4,800 (A$8,300) in 2000 to EUR 7,500 (A$12,975) per tonne in 2006. Costs of battery systems in other EU countries (e.g. Germany and Austria) have been around EUR 1,500 to EUR 2,500 (A$2,600-4,325) per tonne.

There is limited public information about BEBAT's costs. Taking into account the high budget for awareness creation (EUR 5 million, or A$8.65 million) and assuming that BEBAT's collection and treatment cost structure is similar to those of other systems in the EU, it appears that around half of BEBAT's revenues have been set aside as reserves. (Similarly, the Belgian WEEE scheme Recupel had reserves of around EUR 240 million (A$415 million) at the end of 2007, equivalent to about 8 years of its costs – an amount which for several years the environment agencies have aimed at reducing to 6 months' costs).

Performance indicators for the BEBAT scheme are provided in Table 19, including a comparison of batteries put on the market (POTM) and batteries recovered.

Table 19: Performance Indicators of the Belgian Battery Scheme BEBAT

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Batteries put on the market (tonnes)	2,994	3,032	3,640	3,873	4,091	3,955	4,339	4,788	4,838	4,942
gr per capita								*464*		
Primary batteries	2,572	2,535	2,926	2,891	2,895	2,903	2,916	3,059	3,128	3,078
Rechargeable batteries	422	497	714	982	1,196	1,052	1,423	1,729	1,710	1,864
Batteries collected (tonnes)	1,389	1,562	1,834	2,105	2,325	2,378	2,476	2,466	2,496	2,424
gr per capita								239		
Collection rate	46%	52%	50%	54%	57%	60%	57%	52%	52%	49%
Revenues (EUR million)	6.5	5.8	9	0.1	11	11.1	12.8	14.8	15.8	18.2
Revenues per tonne collected (EUR)	4,680	3,713	4,907	48	4,731	4,668	5,170	6,002	6,330	7,508

Source: BEBAT annual reports. Figures in grey font based on Perchards calculations.

Effectiveness of legal instruments: The eco-tax rate is not related to environmental damage or to recycling costs. The high tax rate was explicitly meant to put pressure on industry and the consumers to adapt their products or purchasing behaviour. However, since there are few products with batteries in which the battery can be substituted, this objective has not been achieved. However, the tax has been highly effective in putting pressure on industry to find a self-managed solution which has achieved high collection rates. Moreover, the fact that government sets the BEBAT's fees ensured sufficient funding.

Lessons for Australia

BEBAT has made it convenient for consumers to return their spent batteries by providing a dense network of collection facilities – as the Swiss do for beverage containers. It also spends heavily on awareness programs. Relatively heavy investment in collection facilities and communications has enabled Belgium to achieve a higher collection rate for batteries than other member states have managed.

The threat of an eco-tax seems to have been effective in persuading battery producers to band together to find a solution, but this does not seem to have been a factor in encouraging them to pay more for the producer responsibility system in Belgium than in other EU member states, since the level of the BEBAT fee is set by the Government.

We have noted elsewhere that where the producer responsibility organisation sets its own fees, it accumulates reserves which are much higher than necessary: the same appears to be true when the authorities set the fees. But while producers seem to be overcharged for the management of spent batteries in Belgium, Ontario (see below) seems to be underbudgeting.

6.2 Waste Diversion Ontario Battery Scheme

Key features of Waste Diversion Ontario's (WDO) battery scheme are provided in Table 20[17]. As WDO is responsible for policy/program development and Stewardship Ontario is responsible primarily

for funding, a variety of other issues in MS2 and Perchards' analytical framework are not readily applicable to this program.

Table 20: Key Features of Waste Diversion Ontario's Battery Scheme

First Implemented	1 July 2008 for Phase 1 single-use dry cell batteries.
What it covers	The consolidated MHSW program under development (Section 5.0) will include all batteries except lead acid batteries from vehicles, including portable batteries, stationary batteries (still to be defined) and non-lead acid batteries for motive power (electric and hybrid vehicles batteries and batteries for aircraft and railway applications). Standard lead acid batteries for motive power are exempt.
Funding source and liability point	Funding source: Stewardship Ontario (Section 5.0) is the Industry Funding Organization. Liability point: 'Stewards' – the brand owner or first importer into Ontario – are liable for all costs beyond the point of collection.
Authorising legislation	*Waste Diversion Act 2002* (WDA), plus approval by the Minister of the Environment. Ontario's Minister of the Environment defines by regulation products to be subject to product stewardship or EPR. The Minister's requests to WDO specify minimum program requirements, obligated stewards, costs to be addressed and other key program features. Affected stewards establish an Industry Funding Organization (IFO) that, once approved by the Minister, has powers to compel stewards to report and pay fees.
Bodies (industry/ NGO/ government) responsible for managing the system	Waste Diversion Ontario Stewardship Ontario Ontario Electronic Stewardship (OES), the IFO for WEEE

Drivers and Scheme Development

Key drivers for the scheme included public concern about disposal of batteries in municipal waste and concerns about home storage, especially given their toxic nature. A 2006 survey found that 6 in 10 Canadian households placed batteries in the trash and more than one-third of households stored old computers and communications equipment in the home. Stated provincial policy objectives were to[18]:

- Increase diversion from disposal.
- Manage hazardous and "special" wastes in order to protect air, water and soils from possible contamination; minimise impacts from extraction of primary resources; and conserve resources.
- Shift externalised waste management costs onto price of product in order to incentivise changes in market behaviour.
- Support existing and new economic opportunities in Ontario for secondary resource processing and remanufacture.

In December 2006, Ontario's Minister of the Environment requested WDO to develop a diversion program for Municipal Hazardous or Special Waste (MHSW). After working collaboratively with the Industry Funding Organization (IFO) Stewardship Ontario (see Section 5.0), WDO submitted the

program plan in May 2007 and made a variety of revisions in November 2007. The Phase 1 MHSW program, which included single use dry cell batteries, was approved by the Minister in February 2008 and commenced in July 2008. Phase 2 was to include all batteries except single use dry cell batteries and lead-acid batteries from vehicles (See Section 5.0 for other Phase 1 and Phase 2 MHSW materials). However in May 2009, Stewardship Ontario released a Draft Preliminary Consolidated MHSW Program Plan[19] encompassing existing Phase 1 materials, as well as materials that were to be addressed under Phases 2 and 3.

Under the program, stewards must report all quantities supplied for sale or use in the province to Stewardship Ontario. The Year 1 fee rate is C$0.125 per kg. Originally, stewards were responsible for all costs beyond the point of collection, however in July 2008, the Minister requested WDO to ensure stewards bore the full costs of management, from collection through to final diversion or disposal.

Critical Factors Affecting Adoption and Implementation

The Ontario program requires a nexus between fees and the cost of materials being managed in order to comply with the Canadian Constitution. This approach helps to differentiate between industry 'fees for service' and taxes. In addition, there is some scope for modifying the industry fees to help achieve broader environmental objectives of the program.

Interim measures developed in conjunction with Stewardship Ontario for collection, transport and processing remain to be finalised, so implementation data is limited. However, WDO reports an expanding collection system due to commercial opportunities for the private sector response to the range of Ontario's product stewardship and EPR programs; this includes growing retailer interest as a means of attracting customers and providing them a service. However, WDO also report difficulties for stewards in accepting the rigours of Ontario's plan development process, from the consultation process and development of baseline data to a range of program targets and the scrutiny involved in setting stewards' fees.[20]

Other Features

Lead time to implement: Although relatively little time was available between Phase 1 MHSW Ministerial approval in February 2008 and program commencement in July 2008, the preceding consultation process and program development meant that affected industry stewards actually had a reasonable role and timeframes in program development in order to understand and implement the program.

Auditing and enforcement: Audit data is not yet available for Ontario's battery program. It is likely that initial efforts are focusing on understanding and adoption, with formal auditing to follow later.

Public reporting information: Section 22 of the WDA requires WDO to prepare and make public an annual report from April 2004 and annually thereafter. Section 33 of the WDA requires the designated IFOs for each waste diversion program to submit annual reports no later than 1 April each year; these reports are posted when received by the WDO Board of Directors.

Complementary measures: A range of complementary measures are underway or anticipated, including[21]:

- Finalising interim Stewardship Ontario collecting, transporting and processing guidelines;
- A sampling study of batteries from public collections (for brands, battery chemistry and mercury contamination);
- Calls for collection site Expressions of Interest; and
- Possible co-branding of industry efforts.

Other Canadian provinces (Nova Scotia and British Columbia) are also developing WEEE schemes around the same time as Ontario, so these efforts are likely to be complementary to the extent that industry stewards will seek to minimise collection, recycling, regulatory and compliance costs that would otherwise result from a patchwork of varying provincial programs.

Evaluation

The Rechargeable Battery Recycling Company has established over 1,800 collection sites throughout Ontario for rechargeable batteries only. Battery Broker, a reprocessor certified by the Ministry of the Environment as a transfer station and for the transportation of hazardous battery waste, has established an estimated 500-700 collection sites. As of May 2009, Stewardship Ontario has also registered 103 municipalities as collection sites (including 55 permanent depots, 22 seasonal sites and more than 250 special events). Also as of May 2009, 81 Home Depot stores and 73 Rona stores had become registered collection sites. An example of battery integration into MHSW collection is provided in Figure 4.[22]

Figure 4: Integrated MHSW Collection in Ontario
(Source: Stephenson 2009)

Ontario is estimated to collect 366 tonnes of primary batteries in its first year of collections from a population of 13 million residents, and this figure does not include independent collection networks. Stewardship Ontario's Year 1 budget for the battery program is C$631,000, for an indicative cost of around C$1.72/kg (A$2/kg) collected. In contrast, Belgium's battery collection program (Section 6.1) anticipated revenues of EUR 18.2 million per year to recover 2,562 tonnes of batteries in 2007 from a

population of around 10 million. However, operating costs are expected to be about half of revenue, so the operating cost should be around EUR 3.55/kg (A$6.10/kg) collected. Although Ontario's battery program costs and stewards fees are expected to rise significantly as consumers demand more convenient collection options and higher collection rates, they appear to be more cost effective than in Belgium's established battery program.[23]

Lessons for Australia

Ontario's MHSW program, including batteries, resulted in part from public concern about the toxicity of products stored in the home or going to disposal. Although various reports have highlighted storage issues for items such as mobile phones, TVs and computers in Australia, the general consumer response does not appear to be as strong in Australia. However, it should be noted that recent choice modelling has shown that consumers are prepared to pay for proper recycling and disposal of WEEE in Australia. Despite this willingness, ensuring that consumers avail themselves of available collection and recycling programs to actually return designated products is an ongoing concern.

Some specific lessons from Ontario's battery program and broader product stewardship efforts have been articulated that seem applicable to Australia[24]:

- Collecting and transporting mixed consumer batteries involves a certain level of risk.
- Battery management programs should be integrated across the broad range of batteries on the market.
- Integration of battery programs with broader recycling programs can be especially effective.
- National approaches are preferred by virtually all stakeholders.
- The battery industry may likely question the need to divert alkaline batteries from landfill.
- In Ontario, the battery industry preferred to study the issue first, develop appropriate processing capacity and then institute the collection system. This approach resulted in low collection and diversion targets relative to other Phase 1 MHSW materials. There is an important balance to be struck between effective planning and design, and implementing programs where lessons in early efforts can be used to improve subsequent program rollout and reduce costs.

7.0 British Columbia's Encorp Pacific Program

British Columbia's Encorp Pacific (Canada) (hereafter simply referred to as Encorp Pacific) is a not-for-profit product stewardship corporation intended to optimise recovery of consumer packaging and products[25]. Key features of Encorp Pacific are provided in Table 21.

Table 21: Key Features of Encorp Pacific

First Implemented	First established in March 1994 as Encorp Pacific Inc.
What it covers	Beverage containers (with a separate milk container program) and WEEE
Funding source and liability point	**Funding source:** Unredeemed deposits from beverage containers; container recycling fees (CRFs) that may be charged to help ensure the full costs of recycling each type of beverage container are being recovered; revenue from the sale of aluminium and plastic scrap; and revenues from service provider contracts. WEEE collections are financed by an environmental handling fee (EHF) collected when designated electronics are first sold. **Liability point:** For the CDS program, liability rests with the filler/importer that first places eligible drinks on the market; they initiate a deposit, which is charged through to the final consumer and the deposit is redeemed when the container is returned for recycling. For designated electronics (computer equipment and TVs) ultimately covered under the WEEE program, all "first sellers" are required to be part of an approved industry take-back and recycling program.
Authorising legislation	Legislation authorises the product stewardship framework within which Encorp Pacific provides collection and recovery services for affected industries. The CDS legislation for beverage containers dates back to the Litter Act 1970, which was replaced by the Beverage Container Stewardship Program Regulation 406/97, in turn replaced by the October 2004 Recycling Regulation. In 2007, the Recycling Regulation was amended to include designated electronics.
Bodies (industry/ NGO/ government) responsible for managing the system	Encorp Pacific (Canada)

Drivers and Scheme Development

The program's original form, Encorp Pacific Inc. was owned by the major retail grocers and carbonated soft drink fillers and established in March 1994 to help standardise the collection system for used beverage containers under the province's CDS program. The CDS program was originally implemented under the Litter Act 1970, which was replaced by the Beverage Container Stewardship Program Regulation 406/97. In addition to providing transport logistics, Encorp began to establish a network of privately-owned container redemption depots. Figure 5 shows British Columbia's CDS program, with Encorp Pacific as the industry consortium responsible for central program management. Due to varying deposit and CRF values by container size and material type, Figure 5 is indicative only.

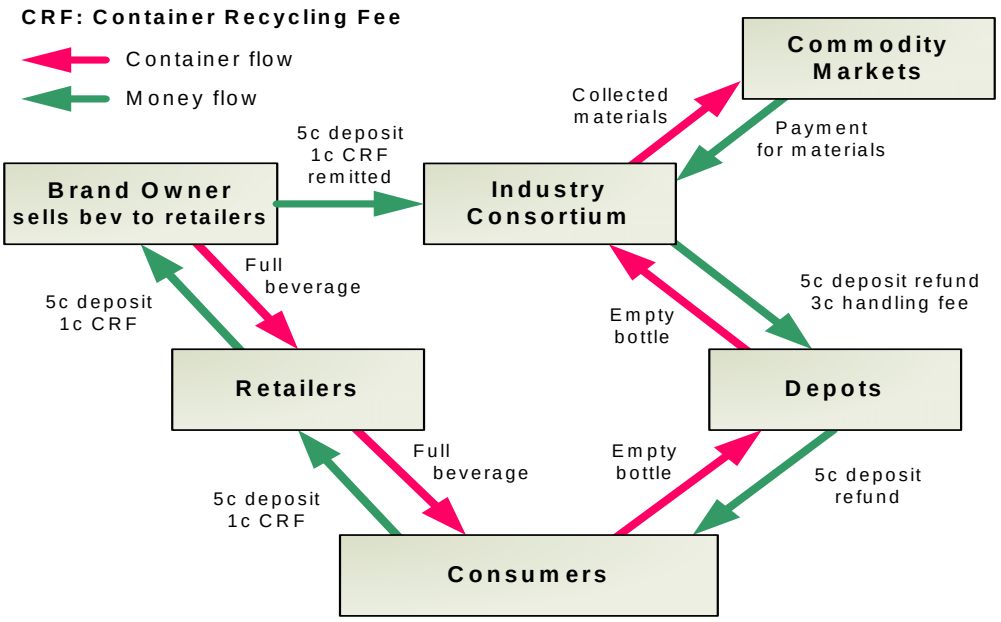

Figure 5: Encorp Pacific's Role in British Columbia's CDS Program
Source: MS2 2006

In 1997, the provincial government expanded the deposit program to include all ready-to-drink beverages, excluding milk and milk substitutes, under the new Beverage Container Stewardship Program Regulation 406/97. Encorp submitted its Beverage Container Stewardship and Management Plan to the Ministry of Environment, Lands and Parks in February 1998, as required by the Regulation. Conditional approval for the plan was provided in April 1998, and the Beverage Container Stewardship program took effect in October 1998. At the same time, Encorp Pacific (Canada) succeeded Encorp Pacific Inc. as a federally incorporated, not-for-profit, non-share capital, corporation. In September 2000, a consolidated stewardship plan was approved, which included polycoat (also known as aseptic containers, Tetra Paks or juice poppers) and stand-alone pouch containers into the deposit system.

In 2001, Encorp Pacific began collecting non-refillable alcohol containers as a service provider to the British Columbia Liquor Distribution Branch. In 2007, these containers and the producers joined Encorp who then became the official stewardship agent for this category.

The October 2004 Recycling Regulation repealed the Beverage Container Stewardship Program Regulation 406/97 and placed beverage containers as a Schedule under the new Recycling Regulation, thus requiring that a stewardship plan for beverage containers be filed with the Ministry of Environment. The current stewardship plan was submitted October 2006, supplemented with additional information in July 2007 and approved later that month. Also in 2006, Encorp Pacific began collecting dairy containers as a service provider under a voluntary, industry-led initiative by the British Columbia Dairy Council.

In 2007, the Recycling Regulation was amended to include designated electronics (computer equipment and TVs). Under the amendment, all “first sellers” of designated electronics were required to be part of an approved industry take-back and recycling program and an environmental handling fee (EHF) was authorised to be collected when designated electronics are first sold. All EHF revenues are used for

WEEE program administration, collection, transportation, and recycling. Collection of the EHF was tied to WEEE program launch, which took place in August 2007. Encorp Pacific runs the program under contract to the Electronic Stewardship Association of British Columbia (ESABC).

Table 22 shows EHF amounts as of June 2009 for designated electronics, as defined under the program.

Table 22: Environmental Handling Fees for Designated Electronics in British Columbia

Designated Electronics	EHF (in C$)
Desktop Computers: Includes Central Processing Units (CPUs), mouse, keyboards, cables and other components within the computer. This includes desktop computers, desktop computers acting as servers, and all associated keyboards and cabling.	$10
Computer Monitors: A display device used for displaying images from computers or other sources that does not meet the definition of a television. This includes traditional Cathode Ray Tube (CRT) and flat panel display technologies.	$12
Notebook Computers: Includes portable computers such as notebook, laptop and tablet PCs.	$5
Desktop Printers and Fax Machines: This includes printing devices that are designed to reside on a work surface, and includes various printing technologies, including Laser & LED (electrophotographic), ink jet, dot matrix, and "multi-function" or "all in one" devices that perform different tasks such as copy, scan, fax, print, etc.	$8
Televisions: A video display device with an imbedded television tuner. This includes various display technologies, such as traditional CRT, flat panel or rear projection.	$15–45, depending on size

Source: Encorp Pacific 2009b

The ESABC and Encorp Pacific's stated reasons for WEEE recycling[26] are:

> *"Electronic waste - old, obsolete electronics - is piling up in our landfill sites. Most commodities found in electronic waste can be recycled and recovered. Steel, glass, copper, (aluminium), plastic and precious metals can be extracted and reused in new products.*
>
> *Electronic waste can contain hazardous materials such as lead, mercury and brominated flame retardants. These substances of concern build up over time and can cause environmental problems. The Industry (members of ESABC) continues to make advancements in the reduction and elimination of the use of some of these materials. The Return-It Electronics program ensures that returned end-of-life electronics containing these substances of concern will be kept out of landfills and will be recycled in a safe and responsible way."*

More broadly, Encorp Pacific's operating principles[27] are:

- *"To develop and operate a system which provides consumer-friendly and cost-effective service throughout the province*
- *To manage the system efficiently so as to have the lowest impact on consumer shelf prices*
- *To run a cost-based system in which each product type pays its own expenses with no cross-subsidization from other products or companies*

- *To divert used products from landfill and incineration*
- *To maximize the value of the recovered commodities*
- *To treat all brand owners equitably"*

Critical Factors Affecting Adoption and Implementation

Logistics: Encorp Pacific contract out all collection and logistics to third parties and credit this approach for their ability to scale up to handle new materials as needed and achieve economies of scale from that expansion.

Key stakeholders: Key stakeholders include the beverage and electronics industries that discharge their legislated collection and recycling responsibilities through Encorp Pacific, as well as the dairy industry's commissioning of Encorp Pacific for the industry's voluntary product stewardship program. Encorp Pacific's principle of avoiding material cross-subsidisation helps to maintain the internal integrity of each of their collection schemes while also ensuring transparency and accountability within those schemes.

Legal Obligations and Free Riders

The legal obligation: For the CDS program, liability rests with the filler/importer that first places eligible beverages on the market. For designated electronics, all "first sellers" are required to be part of an approved industry take-back and recycling program. Both these programs are governed by provincial legislation and regulation.

Free-riding and the structure of the compliance organisations: By imposing liability at the first point of sale or first introduction into the market, British Columbia appears to minimise potential impacts of free-riders. However, one example of free-riding cited by Encorp Pacific is the increased quantity of home brew beer and wine bottles being returned to collection depots, as the bottles are not included in the CDS program and therefore not eligible for refund. Encorp Pacific indicate that 'these returns have increased to an unacceptable level' and have been reinforcing labelling and redemption requirements with the collection depot operators.

Other Features

Lead time to implement: As Encorp Pacific's efforts are conducted in close consultation with, and on behalf of, affected industry groups as an approved service provider, less lead time is required to implement programs than is usually required for other regulatory programs where the industry must be identified, engaged and educated for program implementation.

Auditing and enforcement: Encorp Pacific's financial statements are prepared in accordance with standard Canadian accounting principles, with independent auditors conducting annual audits and verification of financial statements. The audited financial statements are included in Encorp Pacific's publicly available annual reports.

For the WEEE program, all recyclers are required to meet Electronics Product Stewardship Canada (EPSC) Recycling Vendor Qualification Standards, which include environmental, health, safety and export provisions. Document and on-site audits are conducted for all recyclers in the EPSC program.[28]

Public reporting information: Encorp Pacific has made annual reports and audited financial statements publicly available since 2001. The 2008 annual report has now been made available in a more interactive online format than seen in previous annual reports. A report on Encorp Pacific's emissions has also been prepared for the first time covering 2008 emissions and designating 2008 as the base year for future reports. Stewardship plans, Ministerial authorisations and a broad range of other information is also available on Encorp Pacific's website.

Complementary measures: Encorp Pacific conducts extensive consumer education efforts across a range of consumers and potential generation points (including multi-unit developments, schools and workplaces) that effectively complement their infrastructure network and other program features for the range of products collected for recycling.

Evaluation

As of 2007, Encorp Pacific had collected and recycled over 8 billion used beverage containers, and now recycles over 1 billion used beverage containers p.a. (around 243 per capita p.a.). These containers were collected through a network of 170 independently owned and operated depots, all of which are under contract to Encorp Pacific for collecting the containers. Not all of the depots are under contract to collect milk containers and WEEE; around 130 depots collect milk containers at least 70 collect WEEE items.

Encorp Pacific collected and recycled over 86,800 tonnes of material in 2008, resulting in greenhouse gas (GHG) savings of around 138,000 tonnes carbon dioxide equivalent ($CO_{2\text{-}e}$); this represents an additional savings of 12,000 tonnes $CO_{2\text{-}e}$ compared to 2007.

In 2008, Encorp Pacific had C$152.4 million (A$176.8 million) in gross revenues and total reserves of around C$1.8 million (A$2.1 million). Over the past three years, Encorp Pacific has significantly reduced these reserves (from reserves of C$16.3 million or A$18.9 million in 2006) through direct program spending. As operational expenses are segregated but not separately reported for beverage containers and WEEE, it is not possible to apply some of the cost-benefits parameters for material types provided for other programs in this report.

Lessons for Australia

By having Encorp Pacific responsible for central management of British Columbia's CDS program, industry has reasonable flexibility in running the program. However, as opposed to a variety of industry-run CDS schemes, material and financial flows are precisely tracked and especially transparent. This contrasts with CDS programs in most other jurisdictions, including South Australia. Studies have found that South Australia's 'supercollector' arrangements involve inefficiencies costing A$4.1 million p.a., or A$35,000 per depot. Under South Australia's supercollector arrangements, brand owners and fillers also have no incentive to help increase recovery rates.[29]

In contrast, most industry-run CDS programs lack the transparency and accountability of Encorp Pacific, while Government-run CDS programs, such as Hawaii and California tend to have greater

transparency and accountability, but lack Encorp Pacific's flexibility to optimise recovery while controlling program costs.

In its 2007 Annual Report, Encorp Pacific notes that typical private sector responses to product stewardship can be unworkable, as they encounter public distrust and basic competition concerns; similarly, industries resist government-run programs given their past performance. Given these concerns, Encorp Pacific can serve as a useful model for showing how producers can discharge their product stewardship or EPR obligations through a not-for-profit organisation in a relatively forthright manner.

8.0 Waste Electrical and Electronic Equipment

8.1 Minnesota's WEEE Scheme

Key features of Minnesota's WEEE scheme are provided in Table 23.

Table 23: Key Features of Minnesota's WEEE Scheme

First Implemented	July 2007
What it covers	**Video display device (VDD)**: TV or computer monitor, including a laptop computer, that contains a cathode-ray tube or a flat-panel screen with a screen size greater than nine inches measured diagonally, and marketed by manufacturers for use by households in Minnesota. **Covered electronic device (CED)**: Computers, peripherals, facsimile machines, DVD players, video cassette recorders, and VDDs used by households in Minnesota. Business and institutional sources are specifically excluded from each category.
Funding source and liability point	**Funding source**: Manufacturers, ultimately, who are responsible for ensuring CED recycling and face fines for failure to achieve designated recycling rates. **Liability point**: Primarily manufacturers, although retailers and other parties also have some obligations for registrations and reporting. Manufacturer responsibility is based on sales weight.
Authorising legislation	*Minnesota Electronics Recycling Act 2007*, amending Minn. Stat. §§ 115A.1310 to 115A.1330.
Bodies (industry/ NGO/ government) responsible for managing the system	The Minnesota Pollution Control Agency (MPCA) is the lead agency for implementation, stakeholder engagement and consumer information, The Minnesota Department of Revenue collects fees from registered manufacturers, and is responsible for manufacturers' reporting of sales and recycling; the agency is also responsible for collection of fees where recycling goals are not met.

Drivers and Scheme Development

Data on drivers for the introduction of Minnesota's WEEE program are scarce, but are believed to be concerns about toxicity of the WEEE items and the failure to develop a nationally consistent program for addressing WEEE in the US.

Minnesota's scheme evolved over a relatively long period of time, and in both conjunction and isolation from national WEEE efforts (as those efforts proved fruitless). An Agency report to the Minnesota Legislature in 1995 recommended a disposal ban for WEEE items. This was followed in 1999 by the listing of CRTs as a priority for product stewardship.

From 2001 to 2004, Minnesota also participated in the National Electronics Product Stewardship Initiative (NEPSI), an ultimately unsuccessful attempt to develop a national product stewardship approach in the US for WEEE. Minnesota further participated in a regional policy development approach that commenced in July 2005 and also included Wisconsin, Illinois, Iowa and Michigan, with support from the US Environmental Protection Agency (US EPA). The approach vetted three financing options in December 2005, selected a draft "Eco-fee" option in January 2006 and issued a policy statement about the proposed approach in April 2006. The US Council of State Governments adopted a resolution based on the regional approach in December 2006.

Acting on its own, Minnesota enacted a CRT disposal ban in 2003 and convened a Waste Electronics Consultation Process in 2004. A Regional Policy Development and Legislative Task Force was convened in 2006, and Task Force language passed Minnesota's House Ways and Means Committee the same year.

Following a strong show of legislative support (passing the House 114-16 and Senate 63-1), the *Minnesota Electronics Recycling Act 2007* was signed by the Governor on 8 May 2007. The *Act* had a 1 July 2007 effective date for manufacturers of video display devices (VDDs) to register and on the same date made those manufacturers responsible for collection and recycling of covered electronics devices (CEDs) in proportion to their previous year's sales of VDDs. The recycling target was 60% of the weight of VDDs sold in Minnesota for the first program year (1 July 2007 to 30 June 2008) and increased to 80% on 1 July 2008.

Any manufacturers failing to meet their recycling targets are assessed penalties on a sliding scale of US$0.30, $0.40 or $0.50 per pound sold based on percentage of their goal they were able to meet.

Critical Factors Affecting Adoption and Implementation

Minnesota's WEEE scheme is clearly performance-based, rather than prescriptive. For instance, the *Act* does not prescribe collection methods and CEDs collected can be any brand, without having to be those of the individual manufacturers responsible for collection.

One aspect that is likely to have minimised opposition to the *Act* is that achievement of the recycling targets is based on each manufacturer's sales of VDDs in Minnesota, and not on legacy WEEE products.

Legal Obligations and Free Riders

The legal obligation: Liability rests primarily with manufacturers to achieve their recycling targets based on weight from previous years' sales. Retailers and other parties such as collectors and recyclers also have obligations for registrations and reporting that complement the manufacturers' responsibilities, such as the obligation for retailers to report annual sales of VDDs to the manufacturers of those VDDs on 1 July of each year.

Collectors of CEDs must register and report the following information:

- weight of material collected (in pounds);
- the source of the material; and
- destination of collected materials sent for recycling.

In addition to registering, recyclers must report the weight (in pounds) of material received and certify that they are:

- insured;
- licensed;
- in compliance with regulations, and
- not using prison labour.

Free-riding and the structure of the compliance organisations: Minnesota's approach to free-riders is based primarily on coordinated efforts from required registrations. Manufacturers, collectors and recyclers are required to register with the State. Manufacturers that have not registered with the State cannot sell their VDDs in the State and retailers can only sell registered brands to consumers (including retail, online sales and catalogue sales), both of which help to enforce against free-riders.

Other Features

Lead time to implement: Manufacturer obligations commenced within three months of the Governor signing the Act, which seems especially steep since the manufacturers were not only responsible for registration, but they also assumed collection responsibilities.

Auditing and enforcement: In addition to encouraging conformance with US EPA guidelines for electronics recycling, Minnesota requires manufacturers to use only registered collectors and recyclers that comply with accepted standards of operation. Enforcement action is being taken against non-reporting entities, however since these actions are underway, detailed information is not available at this time.

Public reporting information: Minnesota's various registration and reporting requirements assist in MPCA compilation of data for public reporting in addition to providing useful cross-checks.

Complementary measures: Assessing penalties on a sliding scale (percentage of their goal they were able to meet) for manufacturers failing to meet their recycling targets should provide some level of

financial incentive for manufacturers to achieve their target, although the full incentive value of this approach remains to be seen.

The *Act* also created a credit of 0.5 pounds that is added to each pound collected outside the 11-county Minneapolis - St. Paul metro area in order to provide incentive for WEEE collection from more remote areas. As long as the credit is tracked separately in order to avoid overstatement of collection activity, this approach would appear to be an effective complementary measure.

Evaluation

The MPCA reports a significant increase in WEEE collection opportunities after the *Act*'s adoption, with 236 registered collection sites and a wide variety of special collection events serving Minnesota's 5 million residents. The MPCA also reports 33.4 million pounds (15,150 tonnes) of CEDs collected from households for recycling in the first year of program implementation and a recycling rate equal 6.46 pounds (2.9 kg) per capita. Around 34% of the total amount was collected from outside the Minneapolis - St. Paul metro area, so the credit for collections from remote areas appears to be having some initial impact. Given the tendency for consumers to stockpile WEEE items, it is initially unclear whether the program will maintain such recycling levels or whether some of the initial recycling activity is from stockpiled items. Collection methods reported by the MPCA by source are shown in Figure 6 and reported by pounds and by percentage.

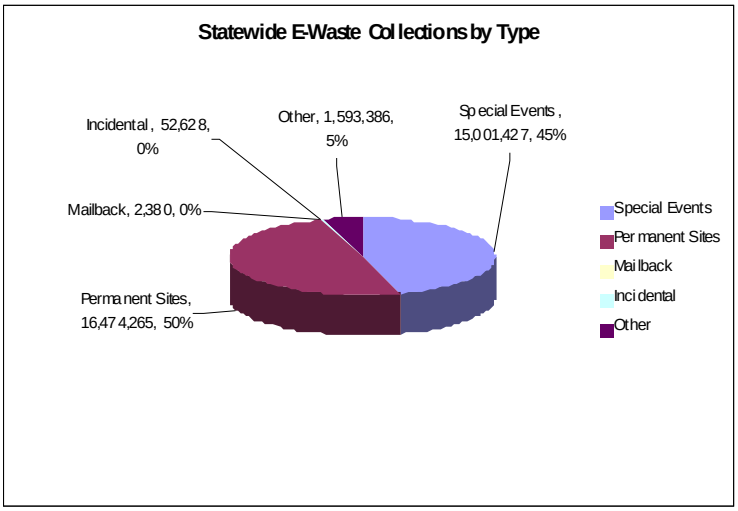

Figure 6: Minnesota WEEE Collections by Type
Source: Bujak 2009

The MPCA reports that recyclers have reduced their charges for processing CEDs collected by municipal recycling programs, although the extent of these reduced charges is not readily apparent.

Lessons for Australia

Minnesota has circumvented some of the usual arguments around legacy WEEE products by holding manufacturers accountable for recycling a proportion of their previous year's sales and by not requiring that recovered WEEE items be a given manufacturer's brands. This approach also allows for flexibility

in determining optimal, more cost-effective approaches. The complementary approach of providing additional credits for recovery from remote areas also helps to ensure that remote areas are not neglected. This unintended consequence can happen in schemes where participants seek the most cost-effective approaches to meeting tonnage-based targets, as seen with Australia's National Packaging Covenant.

Data is not yet available on costs to participants of Minnesota's registration, reporting and take-back requirements, but these requirements appear to have been designed to allow for compliance cost minimisation. Although the scheme's take-back requirements and provisions such as not allowing retailers to sell non-registered brands seem especially strong, they are also likely to minimise costs from free-riders.

Some of the program's challenges cited by the MPCA include[30]:

- lack of a consistent national approach;
- allocation of roles and responsibilities, including the role of local government;
- securing agreement on policy and financing approaches;
- enabling industry collaboration and considering the need for anti-trust exemptions; and
- development of performance metrics, data collection approaches and instituting program evaluation.

In addressing these challenges, some of the lessons cited by the MPCA include the needs to[31]:

- address the disconnect between commodity markets and collection volumes;
- integrate waste management and product stewardship into GHG programs (such as Australia's Carbon Pollution Reduction Scheme);
- allow for local economic development and system efficiencies to occur;
- allow for differing business models; and
- ensure a level playing field through policy frameworks and minimising potential impacts of free-riders.

8.2 The Dutch WEEE systems

Key features of the Dutch systems for WEEE arising in private households provided in Table 24.

Table 24: Key Features of NVMP and ICT-Milieu Schemes

First Implemented	1999
What it covers	NVMP: All WEEE categories as per EU Directive except for Information and Communications Technology (ICT) equipment ICT-Milieu: ICT equipment

Funding source and liability point	**Funding source:** Producers finance take-back and treatment of WEEE from municipal collection points and from retailers. Retailers are compensated for collecting WEEE under certain conditions. **Liability point:** Local authorities are responsible for separate collection. A producer's responsibility begins from the moment that WEEE is returned to the municipal collection facility or to the distributor.
Authorising legislation	The WEEE Management Decree of July 2004 Management of White and Brown Goods Decree, 1998
Bodies (industry/ NGO/ government) responsible for managing the system	VROM (Ministry of Housing, Spatial Planning and the Environment) Senternovem (Environment Agency) responsible for approving the WEEE systems by authorizing the systems operational plans. NVMP (Netherlands Foundation for the Disposal of Metal and Electrical Products) ICT-Milieu, a foundation for the recycling of waste from ICT products under ICT Office, an association of producers of ICT products

Drivers and Scheme Development

The Management of White and Brown Goods Decree 1998

The Decree required producers to take back from January 1999 large white goods (refrigerators, freezers, air conditioners, ventilation equipment, washers, dryers, stoves and ovens) and from January 2000 audio equipment, small household appliances (irons, vacuum cleaners, sewing and knitting machines and blenders), tools and heaters.

- Local authorities were required to provide for the separate collection of WEEE from households and small retailers. This was done through the adaptation of existing systems rather than the creation of new ones.

- Retailers had the choice of selling taken-back WEEE second-hand, handing them directly to a recycling company (except for products containing CFCs), returning them to the manufacturer or importer or handing them in at a local authority collection site.

- Producers and importers had to take back WEEE free of charge from retailers and local authorities and arrange for their final disposal.

Producers were only responsible for the brands they sold, but the Environment Ministry hoped that industry would set up a collective scheme to manage the take-back obligations collectively. The Decree banned the landfilling or incineration of WEEE and major components (residues from processing this waste may be incinerated but not landfilled) and trading of refrigeration equipment containing CFCs (except for second-hand sales between private individuals).

WEEE Management Decree 2004

As an EU member state, the Netherlands had to transpose WEEE Directive 2002/96/EC. The main features of the new 2004 WEEE Management Decree were:

- the extension of the scope to include automatic dispensers, sport and leisure equipment and medical appliances; and
- the clarification of conditions under which retailers and other businesses could return WEEE to municipal collection points.

An amendment to the WEEE Management Decree adopted in December 2007 makes approval of systems permanent (rather than approving them for 5-year periods). However, the Ministry retains the right to revoke the approval at any time.

WEEE system NVMP – for all EEE except ICT equipment

NVMP (Stichting Nederlandse Verwijdering Metalektro Producten, the Netherlands Foundation for the Disposal of Metal and Electrical Products) was set up in response to the Management of White and Brown Goods Decree and began operating in 1999. NVMP is the 'umbrella organisation' for 6 financially independent foundations: the Foundations for White Goods, for Brown Goods, for Central Ventilators, for Electrical Tools, for Metal and Electrical Products and LightRec (light sources). Key features of NVMP are:

Visible recycling fee: A "waste disposal fee" or visible recycling fee (VRF) is charged to the purchaser of electronic equipment, and passed back through the distribution chain to the producer who pays the fee to NVMP. The Environment Ministry VROM has accepted this practice, though it is not stipulated in the legislation. The Dutch competition authority (NMA) withdrew its initial objection after the publication of the new WEEE Decree in 2004, which made such a fee optional and required that if used, the fee must be shown throughout the distribution chain;

In practice, the fee is set at zero for many products to simplify administration and get acceptance from retailers. For example, as regards consumer electronics, there is currently a fee only on DVD players (EUR 3 or A$5.20 per unit) and not on other products. The fee is not related to eco-design or to the end-of-life costs of the product it is attached to, but is a pure financing tool for all consumer electronics.

Retailer refund: Retailers of white and brown goods with net annual purchases of over EUR 50,000 (A$86,500) are entitled to a refund from NVMP for "services rendered in the framework of the implementation of the WEEE Decree". The refund is about 0.2% of turnover for white goods and 0.3% for brown goods. The refund constitutes about one-third of NVMP's operating costs for these products.

Financial reserves: The NVMP foundations have not consistently disclosed their financial data. Since 2002 NVMP has had annual revenues of around EUR 45 million (A$77.9 million) and annual costs of around EUR 20 million (A$34.6 million); this equates to revenues of around EUR 650 (A$1,125) and costs of EUR 280 (A$484.40) per tonne of WEEE collected. Continuous operating surpluses have generated financial reserves of around EUR 150 million (A$259.5 million) which NVMP argues it

requires to cover costs of historical waste between 2011[7] or 2013[8] and 2020, when the WEEE Directive prohibits a visible fee. Initially, NVMP had set aside EUR 30 million (A$51.9 million) as a reserve in case a large producer went bankrupt. The high level of reserves was the subject of a parliamentary enquiry in May 2006, and the environment agency has subsequently tried (unsuccessfully) to cap producer responsibility systems' reserves to 6 months of costs.

Sources of WEEE: NVMP (as well as ICT-Milieu) receive 85% of the WEEE they process from municipal collection points, 14% from retailers and 1% from various other channels.

Stichting Spaarlicht, dissolved

The short history of Stichting Spaarlicht illustrates the diverging interests of retailers who are obligated as importers of lamps and those of the lamp producers who control NVMP's Stichting LightRec.

Set up by members of the Dutch Retailers' Council (RND) which represents large retailers such as Ikea who import gas discharge lamps directly, Spaarlicht received Government approval in October 2006 for a 5 year period. The retailers decided to set up their own system due to LightRec's high fees, particularly a fee of EUR 0.25 (A$0.42) for energy-saving lamps (retailers estimated the actual recycling cost at EUR 0.04, or A$0.07)).

Spaarlicht was concerned that these high fees did not allow retailers to maintain psychologically important threshold prices such as EUR 1.99, and that this hampered the sale of environmentally-friendly discharge lamps. Spaarlicht lodged a complaint with the Competition Authority against Philips and LightRec for abuse of a dominant market position, and this remains pending. In November 2007 Spaarlicht received a warning letter from the environment ministry (VROM) as its members had opposed the take-back of lamps in retail outlets for health and safety reasons. Following an agreement with LightRec, the halving of Lightrec's fees for energy saving lamps to EUR 0.12 (A$0.21) and the nomination of two members of the Retailers' Council to the LightRec board, Spaarlicht terminated its operations on 1 July 2008.

WEEE system ICT-Milieu – for ICT equipment

Due to complex distribution chains, a wider variety of products and lower WEEE costs per unit, producers of ICT equipment have generally preferred to integrate WEEE management costs into the product price, while producers of large household items – who were usually the first to set up WEEE systems – have preferred recouping recycling costs by charging consumers a visible fee on top of the retail price.

[7] In the case of WEEE other than large household appliances.

[8] In the case of large household appliances – cooling and freezing equipment, cookers, stoves, hotplates, microwaves, washing machines, clothes dryers, dishwashers, electric heaters and radiators, fans, air conditioning appliances etc.

That was also the case in the Netherlands. Members of ICT-Office, an association of 450 companies in the Dutch ICT, telecoms, office and internet sectors, set up ICT-Milieu in 1999 in preference to joining NVMP.

WEEE fees: ICT-Milieu charges its actual costs to members in proportion to their market share (producers pay a monthly or quarterly share of current collection and disposal costs). There is no visible fee, costs being internalised into product costs. ICT Milieu's average cost in 2008 was EUR 290 (A$502) per tonne collected. In 2009, prices are slightly higher.

Key financial data: Revenues (and costs) have been around EUR 8 million (A$13.85 million) per year over the past 3 years, or EUR 300 (A$519) per tonne of WEEE taken back. ICT-Milieu keeps some reserves; in 2007, 3% of operating costs (EUR 0.24 million, or A$0.42 million) were designated as provision for risks.

Operations: Equipment is taken back from all sources – resellers, repair centres and local authorities. ICT arranges transport to dismantlers who document the quality and quantity of the equipment received and calculate the fees chargeable to producers. ICT-Milieu has a four-year contract with SIMS MIREC for collection and treatment on a negotiated rather than a tender basis. The price per tonne taken back is adjusted each year, and was EUR 290 (A$501.70) in 2008.

Collection results

Legislation allows municipalities and scrap dealers to collect and treat WEEE but requires only producers to report collection and recycling. As a consequence, less than one-third of all WEEE can be tracked. A major part of the untracked WEEE collected by municipalities and sold to scrap dealers or collected by scrap dealers directly is assumed to have been shipped abroad. According to a 2007/2008 study on WEEE streams by Witteveen+Bos commissioned by the collective systems, 18.6 kg per capita of WEEE arose in 2007 in the Netherlands (Table 25).

Around 31% (5.7 kg) of the total 18.5 kg, was processed by the collective systems. Unsurprisingly, the systems primarily receive WEEE with negative material value: 86% of discarded cooling equipment and half of all discarded ICT equipment, mainly monitors, but only 10% of the valuable discarded non-cooling large household equipment.

Around 69% of WEEE is not reflected in official WEEE statistics. The study estimated that:

- municipalities retained and managed 13% on their own account;
- scrap dealers collected 19% of WEEE - essentially all discarded non-cooling large household equipment;
- 11% of WEEE ended as unsorted municipal waste - essentially all discarded toys, 90% of sports equipment and 70% of halogen lamps; and
- the destination of 25% of WEEE remains unknown. This is the case for one-third of discarded large non-cooling household appliances and small household appliances.

Table 25: Destination of Dutch WEEE by Product Type

Study on 2007 WEEE arising and destination (kg per capita)	NVMP /ICT	Municipalities	Scrap dealers	Unsorted waste	Unknown	Total
Large household EEE	0.82	1.25	3.30	-	2.64	8.00
Cooling equipment	1.55	-	-	-	0.28	1.80
ICT, PC, telecom equipment	1.25	0.95	-	0.30	0.19	2.70
Halogen lamps	0.02	-	-	0.07	-	0.10
Small household and consumer EEE (inc. TV)	1.73	0.30	0.30	1.11	1.58	5.10
Tools and gardening equipment	0.35	-	-	0.37	-	0.70
Toys, sports equipment	0.02	-	-	0.18	-	0.20
Total kgs per capita	5.74	2.50	3.60	2.03	4.69	18.60

In late 2007, NVRD (the Association of Municipal Waste Cleaning Services) met with the collective systems NVMP and ICT-Milieu to ask for financing for the separate WEEE collection they carry out. Producers were of the opinion that their responsibility begins from the moment that WEEE is returned to the municipal collection facility or to the distributor and that the separate collection of WEEE is already covered by municipal taxes. They also thought that the municipalities should be required to track WEEE arriving at and leaving municipal collection points. The municipalities were accused of cherry-picking "lucrative" WEEE, some of which may be exported to third world countries. Discussions are ongoing but the standoff remains unresolved pending the upcoming amendment of the EU's WEEE Directive.

Critical Factors Affecting Adoption and Implementation

Logistics: Municipalities, scrap dealers and some retailers collected and treated WEEE on their own account before the Dutch WEEE Management Decree came into force. WEEE legislation has allowed them to continue to do so, without requiring them to report the volumes collected and treated. This has resulted in an estimated two-thirds of all Dutch WEEE not being traceable.

Key stakeholders:

- ***Government:*** VROM (the Ministry of Housing, Spatial Planning and the Environment); and Senternovem (the Environment Agency), which is responsible for approving the WEEE systems by authorising the systems' operational plans.
- ***Municipalities:*** Represented by the NVRD (Koninklijke vereniging voor afval- en reinigingsmanagement)
- ***Producers:*** Represented by NVMP (Netherlands Foundation for the Disposal of Metal and Electrical Products, and ICT-Milieu, a foundation for the recycling of waste from products covered by ICT Office, an association of producers of such products.
- ***Retailers:*** Represented through various sectoral organisations.

- ***WEEE recyclers:*** Represented by EERA (European Electronics Recyclers Association).
- ***Scrap dealers.***

Legal Obligations and Free Riders

The legal obligation: Manufacturers and importers must:

- take back WEEE submitted to them by local authorities and retailers free of charge;
- organise and finance the further disposal of WEEE taken back either themselves or by subcontracting a third party;
- inform the Minister about how they intended to perform this duty and if applicable the way the disposal scheme would be financed and monitored; and
- report to the Government (through the scheme) on products placed on the Dutch market, collected and recycled.

Other Features

Lead time to implement: 3-4 years in terms of volumes taken back. After the start in 1999, WEEE volumes taken back by producers grew to about 5 kg per capita by 2002 and have increased only marginally since then.

Auditing and enforcement: NVMP requires members with total annual disposal fees of over EUR 22,000 to provide an audit certificate of volumes put on the market. NVMP had about 1,500 members at the end of 2007.

ICT-Milieu estimated that in 2002, 32% of all equipment collected was from free-rider products. Membership increased from 180 in 2004 to over 300 by mid-2008.

Evaluation

Ongoing discussion on 'ownership' of collected WEEE

After almost 10 years of having operational WEEE systems, the Netherlands officially report a collection of 5.7 kg of WEEE per capita per annum. This compares to 11kg in Denmark – and to 8.4 kg in Germany in the first year the WEEE legislation was enforced.

The reason for this modest result is that the Dutch WEEE legislation allows municipalities and scrap dealers to collect and treat WEEE, but requires only producers to report collection and recycling. In consequence, less than one-third of all WEEE can be tracked, and a large proportion of the untracked WEEE is thought to be shipped abroad illegally as used equipment rather than as waste.

The WEEE systems primarily receive WEEE with negative material value – 86% of discarded cooling equipment and half of all discarded ITC equipment, mainly monitors, but only 10% of the valuable discarded non-cooling large household equipment.

NVMP's financing systems are not based on the actual costs of recycling

NVMP's fees are set at zero for many product groups to simplify administration and get acceptance from retailers (for example, there is currently a fee of EUR 3 (A$5.19) per DVD player sold, but there is no fee on other consumer electronics such as stereos or CD players. Thus, the financing is not in line with the principle of EPR.

Lessons for Australia

Regulating all parties collecting WEEE or defining the 'ownership' of WEEE

As a large percentage of WEEE has a positive material value, and as such (by some interpretation) is not waste, municipal or commercial structures for the separate collection have been in place prior to legislation. Dutch WEEE legislation allowed municipalities, retailers and scrap dealers to continue commercial WEEE activity but failed to subject them to monitoring requirements. As a consequence, two-thirds of collected WEEE cannot be tracked and 'disappears' into substandard treatment facilities abroad.

The Dutch WEEE situation thus provides an illustration of the biggest challenge member states faced when implementing the WEEE Directive: defining the interface between existing WEEE collection structures (which in the 'old' member states were mostly municipalities and in the new member states mostly commercial scrap dealers) and producers. The WEEE Directive itself is silent or ambiguous on how the municipalities or scrap dealers should be regulated. As a consequence, national transposition legislation varies widely.

The issue is captured in the on-going discussion about the 'ownership' of collected WEEE that being held alongside the 'recast' of the WEEE Directive: the European Commission estimates that 54% of all WEEE collected in EU are illegally exported or undergo substandard treatment. The draft 'recast' of the WEEE Directive (of December 2008) proposes to subject producers to a collection target of 65% of what they put on the market by weight, presumably assuming that waste flows are more easily controllable by one (or a few) central schemes of producers, rather than by hundreds of municipalities who have often long standing commercial and employment interests in the waste management enterprises that serve them. Producers naturally object to the 65% target, arguing that they do not have access to large volumes of WEEE as long as the ownership of collected WEEE is not clear.

Continuous oversight of schemes operating under voluntary agreements

If a government decides on an industry sector-wide agreement that allows a monopolistic compliance scheme to emerge, the right balance needs be found between the scheme's operational freedom needed for its development and the interests of consumers (price) and producers that are not members of the associations that are signatories to the agreement.

High financial reserves (usually a result of using visible fees which per se cannot be adjusted quickly) and long-term exclusive contracts with collectors tend to allow a scheme to become so firmly

entrenched and powerful that steering efforts by the responsible authority are difficult and the emergence of alternative schemes is *de facto* prevented.

The Dutch WEEE Decree foresaw scheme approval every 5 years, a period that may have been too long. A 2007 amendment of the Decree therefore makes the approval permanent. However, oversight is now on a continuous basis and the Government retains the right to revoke the approval at any time.

9.0 US Lamp and other Mercury-containing Products Programs

The US-based Product Stewardship Institute (PSI) has facilitated a range of initiatives to address lamps and other mercury-containing products across America. The PSI has progressively engaged key stakeholders though transparent problem definition, dialogues and serving as a clearinghouse of relevant information. These initiatives complement a range of other US initiatives for mercury-containing products, including state regulatory requirements (such as labelling requirements and disposal bans) and the National Vehicle Mercury Switch Recovery Program[32].

Drivers and Scheme Development

A prospectus for funding prepared by PSI[33] highlights the environmental paradox of fluorescent lamps: while energy-saving and longer-lasting compared to incandescent lamps, fluorescent lamps also contain a small amount of mercury that should not be disposed of in landfills or energy-from-waste (EfW) facilities. Sales and eventual entry into the waste stream are increasing significantly. A proposed issue statement[34] outlined the principal drivers for action in the US as,

> *"Fluorescent lamps emit light through a chemical reaction involving mercury, a harmful neurotoxin that is persistent in the environment and bioaccumulates in living organisms. Lamp manufacturers have reduced the amount of mercury used per lamp significantly over the past two decades for many of their products. However, increased sales of CFLs (*compact fluorescent lamps*) – spurred by consumer demand and statutory requirements for improved lighting efficiency – raise concerns about the fate of mercury contained in the lamps if not properly managed at the end of their useful life. Large and small generators of spent fluorescent lamps are subject to different regulations and typically use different lamps. Only about 30 percent of fluorescent lamps used by business and industry, and 2 percent of the fast-growing residential market for CFLs were estimated to be recycled in 2003, although this estimate has much uncertainty. This low rate of recycling is largely due to a poor awareness about the mercury in lamps and the problems it can cause, an inadequate collection infrastructure (including convenient locations for residential consumers), a patchwork of regulations (including exemptions for residents and other small quantity generators in most states), lack of enforcement, an insufficient motivation for recycling, and significant end-of-life management costs. In addition, bulbs that are broken during use, consolidation, or transport will emit mercury, with the potential to harm those in the immediate vicinity."*

The PSI fluorescent lighting initiative aims to[35]:

> *"promote the use of energy efficient lighting while eliminating or reducing the amount of mercury and other toxins entering the environment during the lifecycle of fluorescent lamps. Specific goals include reducing the environmental impact of the manufacture of fluorescent lighting, increasing the manufacture and procurement of environmentally preferable lighting, and maximizing the safe collection and recycling of spent lamps from households and businesses through the development of a nationally-coordinated system that is financially sustainable."*

Key components of this approach include financing infrastructure for collection and recycling, education and enforcement of disposal bans.

In December 2007, PSI and Women's Voices for the Earth announced a pilot retail collection program for fluorescent lamps and mercury thermostats at a minimum of 25 retail locations in five western US states. The pilot collection of CFLs, fluorescent lamps and mercury thermostats ran from May to December 2008 and was funded by the US EPA. A variety of collection and transport options were explored for compact fluorescent lamps. Thermostats were collected in small bins and shipped pre-paid via FedEx to a facility where the mercury ampoules were removed, and the thermostats were subsequently shipped to a recycling facility.[36]

Three workgroups were established to address the key elements of financing; bans and enforcement; and infrastructure. In conjunction with PSI's development of a *Product Stewardship Action Plan for Fluorescent Lighting* (released June 2008) that provided a concise summary of issues, options and stakeholders, a series of three multi-stakeholder dialogues was held throughout the US from April to July 2008. A fourth dialogue has been funded and is being developed pending 2009 state legislative sessions. Future efforts will depend on the availability of program funding.

In early 2009, PSI released a report on existing or proposed disposal bans for mercury containing lamps and other mercury products, along with a range of model disposal ban provisions[37]. From February to May 2009, PSI also provided letters of support or testimony for legislation in five states.

Critical Factors Affecting Adoption and Implementation

Key stakeholders: Over the course of the initiatives, PSI has identified over 200 stakeholders to date that are interested in fluorescent lamps and invited these stakeholders to participate in a series of dialogues. Participants as of May 2009 have included representatives of[38]:

- US EPA, Energy Star program, environmental agencies of 12 states and 6 local governments.
- Four lighting companies and the National Electrical Manufacturers Association.
- Three mercury recycling companies and the Association for Lighting and Mercury Recyclers.
- Four state or national environmental and public health groups.
- Six energy efficiency advocacy organisations or electrical utilities.

Funding: As this initiative represents a voluntary, facilitative process that spans multiple jurisdictions without specific legislative or regulatory authority on its own, availability of project funding can be a limiting factor. While various federal and state agencies funded the series of dialogues, PSI must secure additional funding for additional efforts and is therefore reliant on securing the cooperation of a diverse range of stakeholders. Funding is being sought for PSI to develop model state legislation, advocate for fluorescent lamp legislation in key states and consider advocating for federal legislation.

Legal Obligations and Free Riders

Legal obligations and efforts to address free riders, while an integral part of the PSI's initiatives, are ultimately the responsibility of the implementing jurisdictions.

Other Features

Public reporting information: Public reporting is not mandatory under the scheme, however the PSI provides a clearinghouse role by posting most program details (workgroup discussions are available only to workgroup members until cleared for public release) on PSI's website.

Complementary measures: Disposal bans can be complementary to legislation addressing lamps and other mercury containing products, and have taken a variety of forms in the US[39]:

- State legislation, as in Maine, Minnesota, and New Hampshire.
- Public rule, as in King County, Washington.
- California allowed the exemption on household fluorescent lamp disposal as a hazardous waste to expire.
- Snohomish County, Washington requires mercury-containing lamps to be recycled.

A range of model disposal ban provisions and examples from existing or proposed disposal bans have been prepared by PSI to address a variety of jurisdictional conditions[40].

Separate multi-stakeholder processes to develop recommendations for fluorescent lamp recycling systems are also underway in California and Dane County, Wisconsin.

Evaluation

AS PSI's efforts are still underway, analysis has focused on results to date. Certain datasets (particularly on program critical factors, costs and benefits) are therefore limited.

Despite a limited base for financial support, PSI has made significant headway in facilitating agreement on key issues and approaches across a broad range of relevant stakeholders. The fact that over 200 stakeholders have been identified, engaged and subsequently participated in dialogues to address lamps and other mercury-containing products is certainly encouraging.

Lessons for Australia

An important lesson is the value of actively engaging key stakeholders across supply chains, governments and other organisations to identify problems, options and solutions. This value has been enhanced even further by PSI's role as a clearinghouse of information about program developments. Development of program objectives, stakeholder engagement and making program data publicly available have been somewhat lacking during development of a variety of product stewardship schemes in Australia.

A wide variety of information is made publicly available as soon as appropriate; it is sensible to keep workgroup discussions confidential or available only to limited parties until approved for public release.

10.0 Conclusions and Implications for Australia

There is no one product stewardship or EPR approach (including any approach examined in this report) that could be simply copied and introduced into Australia for any given product of concern. It is essential to evaluate each program objectively, understand its drivers and evolution over time, and consider its potential applicability to Australian conditions. Whilst the sections for each scheme provide lessons for Australia from that individual scheme, there are some broader lessons that can be drawn.

First and foremost, program drivers, political and legal factors that have influenced program evolution overseas can vary significantly from those in Australia. For instance, a variety of European programs were influenced by shortages of landfill capacity and resulting high costs of landfill, whereas landfilling in Australia is relatively inexpensive and landfill disposal cost is not a significant driver for product stewardship and EPR. Stewardship Ontario initially focused simply on funding one-half of the costs of collecting and recycling commingled recyclables in the Blue Box program, then expanded into comprehensive resource recovery efforts across a broad range of municipal household solid and hazardous wastes. Similarly, Australian debate about product stewardship as a means of re-allocating costs of collection and recycling has focused primarily on packaging (National Packaging Covenant vs. container deposits) and progressively expanded over time to address broader resource recovery and a broader range of items.

When evaluating particular producer responsibility models, care needs to be taken in how lessons from one sector are applied to another. The German packaging take-back scheme (Section 4.1) shows how, in the packaging sector, replacing a monopoly producer responsibility system with an arrangement that allows alternative collective organisations to compete has been detrimental to overall efficiency. By contrast, the Belgian battery take-back scheme (Section 6.1) and the Dutch NVMP take-back scheme for WEEE demonstrate that monopoly organisations for long-life products may take such a conservative view of future liabilities that they accumulate quite unreasonably large reserves, which would not happen if rival compliance systems were competing on price. As any program will likely involve some unintended consequences, it is important to ensure that program objectives and regulatory frameworks are established sufficiently in advance to promote effective program development. Similarly, program development and implementation need to be conducted in a flexible, transparent and accountable manner in order to effectively ensure stakeholder engagement.

Care also needs to be taken when trying to make direct comparisons between countries or programs on key parameters. While some indicators such as tonnes of $CO_{2\text{-}e}$ are standardised and underpinned by fairly robust and understood methodologies, other parameters such as recycling rates can vary substantially in their methodologies. For instance, when comparing European and Australian recycling rates for packaging, it is important to understand that Europe counts the tonnage delivered to a reprocessor whereas Australia counts the output from the reprocessor. In Australian terms, European packaging recycling rates are not as high as they might appear.

Different industrial bases and relations between governments, industry and community groups can result in significant program variation from one program to the next. Programs that collaborate with affected stakeholders and build on the strengths of existing infrastructure, systems and networks (as in the North American efforts of Minnesota and the Product Stewardship Institute on WEEE and mercury-

containing products, respectively) are more likely to have better results and may require shorter lead times to implement.

From a regulatory perspective, lessons from various schemes examined include:

- Program objectives must be clearly articulated.
- Stakeholders often imagine the worst in the absence of specific information about program development and tend to focus on fighting against program introduction. Collaborative approaches are helpful in progressing programs.
- It is important to ensure market intervention is seen as justified, fair and supportive of competition.
- Short implementation times are viable only if there has been effective stakeholder engagement in program design and existing or planned waste and recycling systems are taken into account.
- A robust process for establishing fee structures is essential to ensuring perception of the fees as fair, reasonable and based on actual program costs. The fee establishment process must also allow for regular revisitation as program fees are better understood and audited.
- Introducing product stewardship and EPR into existing marketplaces introduces concerns about redistribution of market share and concern about government picking winners and losers.
- Most manufacturers are active in global markets and tend to strive for consistent standards (whether formal or *de facto*) that have often been established in Europe. Australia is likely to represent such small market share that little change is likely to occur for some policy objectives such as driving 'design for environment'. That said, it should be noted that although EU Directives provide consistency in theory, individual Member States often go in various directions that result in significant disharmonisation, as noted in other sections of this report. Australian officials should be wary of stated unity and harmony of European approaches, in particular.
- Manufacturers will be concerned about recovered products being re-introduced into the marketplace.

Such lessons and their potential applicability to Australia are further elaborated in the Product Stewardship Council's Product Stewardship Principles and Actions, last updated in May 2009 (Appendix B).

Given the myriad of product stewardship schemes and the potential to lose consumer attention, it may ultimately make sense to consider adopting materials-based approaches, such as those targeting mercury-containing products or specific metals.

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Appendix B: PSC Product Stewardship Principles and Actions

Product Stewardship Council
PO Box 755
Turramurra NSW 2074 Australia
www.productstewardshipcouncil.net

An independent, not-for-profit organisation dedicated to understanding and advancing the principles of product stewardship

PRODUCT STEWARDSHIP PRINCIPLES AND ACTIONS – May, 2009

OVERVIEW

The Product Stewardship Council (PSC, www.productstewardshipcouncil.net) is an independent, not-for-profit organisation dedicated to understanding and advancing the principles of product stewardship. The PSC was established to help industries and governments work more effectively together in the development and implementation of product stewardship programs. Discussions with key stakeholders have highlighted the need for a body like PSC to promote product stewardship through independent and transparent analysis, information exchange and facilitation.

PRINCIPLES OF PRODUCT STEWARDSHIP

The PSC supports the following broad principles for product stewardship based on those developed by the US-based Product Stewardship Institute (www.productstewardship.us).

- **RESPONSIBILITY**: The responsibility for reducing product impacts should be shared among industry (designers, manufacturers, and retailers of products or product components), government, and consumers. The greater the ability an entity has to minimise a product's life-cycle impacts, the greater is its degree of responsibility, and opportunity, for addressing those impacts. Manufacturers have the greatest ability, and responsibility, to reduce product impacts.
- **INTERNALISE COSTS**: All product life-cycle costs – from using resources, to reducing health and environmental impacts throughout the production process, to managing products at the end-of-life – should be included in the total product cost. The environmental costs of product manufacture, use and end-of-life management should be minimised, to the greatest extent possible, for local and state governments. Manufacturers should thus have a direct financial incentive to redesign their products to reduce these costs.
- **INCENTIVES FOR CLEANER PRODUCTS AND SUSTAINABLE MANAGEMENT PRACTICES**: Policies that promote and implement product stewardship principles should create incentives for the manufacturer to design and produce "cleaner" products – ones made using less

energy, materials, and toxics, and which result in less waste (through reduction, reuse, recycling, composting and energy recovery where this is carried out under regulations imposing strict emission standards such as those in the EU) and use less energy to operate. These policies should create incentives for the development of sustainable and environmentally-sound systems to collect, reuse, and recycle products at the end of their lives.

- **FLEXIBLE MANAGEMENT STRATEGIES**: Those that are responsible for reducing the health and environmental impacts of products should have flexibility in determining how to most effectively address those impacts. The performance of responsible parties shall be measured by the achievement of goal-oriented results.
- **ROLES AND RELATIONSHIPS**: In realising these principles, industry will need to provide leadership. Government will also provide leadership in promoting the practices of product stewardship through procurement, technical assistance, program evaluation, education, market development, agency coordination, and by addressing regulatory barriers and, where necessary, ensuring compliance. Industry and government shall provide – and consumers should take full advantage of – information needed to make responsible environmental purchasing, reuse, recycling, and disposal decisions.

TRANSLATING PRINCIPLES INTO ACTIONS

Understanding when and how to implement product stewardship schemes is crucial to ensuring that product stewardship principles maintain their integrity and promote meaningful program development. The PSC proposes the following approaches for translating product stewardship principles into action.

Determining Need

- Intended policy objectives need to be made clear and prioritised, and options to achieve those objectives must be fully evaluated and strive to effectively balance social, economic and environmental outcomes.
- A comprehensive, carefully considered approach is necessary as no single policy approach can deliver all desired outcomes nor reflect the full diversity of products.
- Extended producer responsibility (EPR) schemes, and to a lesser extent product stewardship schemes, are generally more appropriate and cost-effective for truly hazardous or expensive to manage products than for relatively benign or inert products where externalities are minimal or where such products do not impose net costs on the community to manage. That said, product stewardship schemes should be facilitated in conjunction with stakeholders in instances where products are not hazardous but addressing them through a consensus-based approach could provide significant externality reduction.
- Programs are more likely to be effective when similar EPR or product stewardship schemes exist overseas. However, the relative costs, benefits and risks of such schemes need to be understood and examined within a local context prior to adoption.
- Approaches requiring greater levels of regulation should be pursued only after market-based, voluntary and co-regulatory approaches have been clearly shown to be relatively ineffective in achieving desired outcomes.
- National, and to the extent practicable, international consistency is critical, and should reflect regional differences, available resources and commitment to common objectives.

- Where necessary, underpinning legislation should be developed in cooperation with industry and effectively enforced by Governments.

Engaging Stakeholders

- Active stakeholder engagement, joint fact finding and constructive, good-faith commitment to achieving optimal outcomes are needed in clarifying objectives and priorities and in developing and implementing product stewardship programs.
- Stakeholders are more likely to collaborate on and effectively implement voluntary and/or co-regulatory approaches than where approaches are unilaterally mandated.

Sending the Right Signals

- Stewardship initiatives should meet their environmental objectives in the most efficient, cost-effective manner.
- Appropriate incentives must be designed to send appropriate signals to all affected parties.
- Intended approaches should incorporate existing infrastructure, policies and programs to the fullest extent possible and seek to minimise negative impacts on existing programs.
- Industry leaders should be rewarded for improving sustainable practices, while laggards should be sent clear messages about need for improvement and be given the opportunity to respond accordingly. Innovation should be encouraged, not stifled.
- Industry should be provided significant flexibility to ensure environmental objectives are achieved in a sensible, cost-effective manner.
- Environmental impacts of energy consumption should also be minimised across the supply and recovery chains, for example decision-making should consider how the product is to be distributed and whether distribution requires special conditions such as refrigeration. The design of the product system should optimise transport efficiency (and therefore fuel consumption), for example by maximising the amount of product transported in a truck or container.
- The potential impacts of external influencers such as changing demographics should be understood and recognised.
- Stewardship initiatives should include promotion of market development and the use of recovered materials where appropriate.
- Appropriate mechanisms should be instituted to ensure effective, transparent monitoring, data collection and public reporting.
- Where available and where carried out under regulations imposing strict emission standards such as those in the EU, energy recovery and resource utilisation through energy from waste (EfW) or alternative waste technologies (AWT) are appropriate for residual materials remaining after cost-effective recycling.

Endnotes

[1] The EC is one of three pillars of the European Union, the others being Justice and Home Affairs and the Common Foreign and Security Policy. The EC includes the European Single Market, which is the legal basis for the Packaging and Packaging Waste Directive.

[2] ADEME 2009

[3] In addition to specifically stated references, key data sources for this section are provided in Appendix A.

[4] In addition to specifically stated references, key data sources for this section are provided in Appendix A.

[5] Evidence for this, including a statement from the then Environment Minister, is cited in Perchards 1994.

[6] In addition to specifically stated references, key data sources for this section are provided in Appendix A.

[7] DEFRA 2009

[8] DEFRA 2009

[9] In addition to specifically stated references, key data sources for this section are provided in Appendix A.

[10] Gies 2008, WDO 2009

[11] Stewardship Ontario 2009b, Stewardship Ontario 2009c

[12] Drawn principally from Stewardship Ontario 2009c

[13] Stewardship Ontario 2009a, WDO 2009

[14] MS2 and Perchards 2008

[15] http://www.stewardshipontario.ca/bluebox/consultation/methodology.htm

[16] Stephenson 2008

[17] In addition to specifically stated references, key data sources for this section are provided in Appendix A.

[18] Gies 2008

[19] Stewardship Ontario 2009b, Stewardship Ontario 2009c

[20] Gies 2008, Stephenson 2008

[21] Stephenson 2008

[22] Stephenson 2009, http://www.batterybroker.on.ca/

[23] Stephenson 2009

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[31] Hickle 2007, Hickle 2008

[32] Hickle 2008

[33] PSI 2009a

[34] PSI 2008, p.2

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