CHAPTER 2

WASTE MINIMISATION

2.1 Although waste minimisation was not strictly part of the terms of reference, the Committee supports the principles involved and therefore considers it is not possible to discuss waste management without some preliminary comments.

2.2 Professor Selinger pointed out the need to step back from the problem and look at the need for products, or possible alternatives rather than how to dispose of them.[1] Only when it was found that the production was essential and that alternatives are not feasible, should environmentally sound methods of reuse or disposal need to be found.

National Waste Minimisation and Recycling Strategy

2.3 The *National Waste Minimisation and Recycling Strategy* was prepared by the Commonwealth Environment Protection Agency in consultation with the Australian and New Zealand Environment and Conservation Council (ANZECC) and was released in June 1992. The Strategy sets a national target of 50 per cent for waste reduction by the year 2000.

2.4 The *Strategy* outlined a number of principles to be adopted. These include the waste management hierarchy, the life cycle approach to products, the precautionary principle, user pays principle, polluter pays principle, economic efficiency, individual and corporate responsibilities, education and awareness and cleaner production.[2] Waste minimisation can be achieved through improvement to the design of products, the inputs used in production, plant processes, housekeeping practices, education of employees and on-site reuse and recycling of materials.[3]

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[1] Sylvan L (1993) 'Intractable Ben' Consuming Interest April :18-21, p.21.

[2] Commonwealth Environment Protection Agency (1992) National Waste Minimisation and Recycling Strategy. Department of Environment, Sport and Territories, p.10-12.

[3] Munoz-Figueroa, Evidence, p.416-417.

2.5 The *National Waste Minimisation and Recycling Strategy* also includes a waste management hierarchy which has been widely accepted. Even though various versions now exist, all have the same basic categories:

Avoidance/prevention
Minimisation
Re-use/Recycling
Treatment
Disposal - landfill/incineration

2.6 The Environmental Management Industry Association of Australia Limited (EMIAA) pointed out that the process is ongoing and would be better represented as a cycle which incorporated the concept of the cyclic and interdependent aspects of the process.[4]

Waste Minimisation Target

2.7 The Commonwealth, State and Territory governments have agreed to a 50 per cent reduction in waste by the year 2000.[5] Although not everyone will agree that this level is achievable,[6] there needs to be commitment to reducing the existing levels and preventing any increase in levels in the future.

2.8 The major barriers to reaching these targets are listed in the *National Waste Minimisation and Recycling Strategy* as:

- the high costs and limitations of existing collection systems;
- instability of commodity markets;
- lack of end use markets and thus lack of demand for recyclable materials;

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[4] Environmental Management Industry Association of Australia Limited, Submission No.63, p.9.

[5] Healey Management Group, Submission No.6, p.4.

[6] Ibid, p.4.

- legislation, regulations and standards that unnecessarily inhibit the use of secondary resources;
- industry attitudes to secondary resource use and consumer attitudes to purchase of recycled products;
- lack of information on appropriate technologies and practices and on the benefits and costs of particular activities;
- the plethora of government agencies that can have a bearing on recycling decisions; and
- contamination of recycled materials.[7]

2.9 It was appreciated by Commonwealth Environment Protection Agency that the achievement of the 50 per cent by the year 2000 target would require a number of substantial reviews and actions which are outlined in the Strategy.[8] CEPA has a program which is currently monitoring progress towards this target.[9]

Holistic Approach

2.10 The increased community awareness of environmental issues in Australia led to the adoption of the *National Strategy for Ecologically Sustainable Development* by the Council of Australian Governments in December 1992. As part of that strategy:

> governments will seek to develop an integrated approach to waste prevention and minimisation, based on a hierarchy of measures at both the government and industry level. These measures will include actions to achieve cleaner production, reduced use of resources, recycling and reuse. In addition, attempts will be made to develop a common

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[7] Commonwealth Environment Protection Agency (1992) National Waste Minimisation and Recycling Strategy. Department of Arts, Sport, the Environment and Territories, June 1992, p.22.

[8] Ibid, p.22-25.

[9] Hyman, Evidence, p.73.

> approach to waste management programs between various jurisdictions.[10]

2.11 The present regulatory systems do not require a total waste management approach. However, the Ecologically Sustainable Development Strategy promoted a move toward that goal. A holistic approach will shift the previous focus from landfill to the other options. This holistic approach considers disposal as one part of the total waste management system. The Committee endorses this approach.

2.12 Systems are now being designed with a more holistic approach, but a major consideration of the responsible authorities will be economics. Some councils are developing a regional approach to achieve efficiency benefits.

2.13 The development of a waste management policy should consider:

> all the available waste disposal options and seek to arrive at a mix of solutions which, for each location, optimises economic and environmental outcomes.[11]

The extent to which various options are utilised would depend on the waste composition, community participation, environmental and planning laws, the availability of end markets for recyclables, demographics, transport costs and local energy costs.[12]

Creating incentives

2.14 Although this report focuses on the treatment of household waste to some extent, the Committee appreciates that there is a need to reduce waste produced by other sectors such as industry and councils.

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[10] *National Strategy on Ecologically Sustainable Development*, December 1992, p.75.

[11] Association of Liquidpaperboard Carton Manufacturers Inc, Submission No.60, p.39.

[12] Department of Environment, Sport and Territories, Submission No.69, p.15.

For example, in Sydney, household waste contribute only 30 per cent of the total waste.[13]

2.15 In achieving the principles of waste minimisation Dr Schenkel outlined a number of strategies which could provide incentives including:

- taxing raw materials;
- imposing quotas on raw materials;
- promotion of long line products;
- leasing instead of buying;
- substitution of sale of goods by maintenance, care and further development;
- making material and energy balances mandatory;
- returning products to retailer/manufacturers;
- minimum storage time for replacement parts;
- identification of life expectancy;
- reviewing relationship between cost of product and repair wages;
- banning one way products where durable alternatives are available;
- taxing non-repairable products; and

[13] Toxic Chemicals Committee, Total Environment Centre Inc, Submission No.36, p.9.

- documentation of eco-balances for product life expectancy including subsequent use.[14]

Cleaner Production

2.16 The United Nations Environment Program defines cleaner production in terms of:

- the continuous application of an integrated preventative environmental strategy to processes and products to reduce risks to humans and the environment;

- conserving raw materials and energy, eliminating toxic raw materials and reducing the quantity and quality of all emissions and wastes before they leave the process;

- reducing impacts along the entire lifecycle of the product, from raw material extraction to ultimate disposal of the product; and

- applying know how, by improving technology and by changing attitudes.[15]

2.17 Cleaner production embodies process efficiencies which relate to the better use of resources and minimised inputs.[16] Waste can be generated from the production processes or as post consumer waste of the products, and both the volume and toxicity of both forms need to be addressed.[17]

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[14] Schenkel W (1992) *Scientific and Technical Aspects of Waste Management - Reviewing the Past and Looking Forward to 1996* Paper to the International Solid Waste Congress, Madrid 1992, cited in Friends of the Earth, Submission No.48, p.3.

[15] United National Environment Program (1994) International Context of Clean Production' UNEP, *Economic Growth With Clean Production Conference* Papers, Melbourne.

[16] Cole, Evidence, p.526.

[17] Local Government Association of New South Wales and Shires Association of New South Wales, *A response to the Minister for the Environment's Green Paper on waste management Executive Summary*, March 1993, p.viii.

2.18 Businesses have influence over the packaging, transportation and distribution methods, durability, repairability and recyclability.[18] Businesses can derive financial benefits from a reduction in the amount of raw materials used, reduced waste disposal charges and occupational exposure to hazards.[19] This can benefit manufacturers who have an advantage in being seen as green.[20]

2.19 The Australia Centre for Cleaner Production provides services involving consultancy, education and technology transfer in cleaner production. The Centre is currently under the auspices of the Victorian EPA but will soon become a company independent of government.[21]

2.20 The focus of the Centre is on pollution prevention and waste minimisation, greater efficiency and energy conservation with benefits for both industry and the environment. The Centre's goal is:

> to achieve the widespread adoption of internationally-competitive cleaner production philosophies and practices in industry, government and academic institutions in accordance with the principles of sustainable development.[22]

2.21 The Commonwealth Environment Protection Agency's *Cleaner Production* and *EcoRedesign* projects provide funds for volunteer companies to investigate cleaner production opportunities.[23]

2.22 Cleaner production techniques are not only preferred for their environmental sustainability but are considered to be the most economically advantageous in the long term.[24] The ultimate goal is the complete elimination of the production of toxic substances during the

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[18] Department of Environment, Sport and Territories, Submission No.69, p.17.

[19] Ibid, p.17.

[20] Ibid, p.17.

[21] Robinson, Evidence, p.657.

[22] Australia Centre for Cleaner Production Capability Statement, p.3.

[23] Waste Crisis Network, Supplementary material, p.2.

[24] Centre for Applied Colloid and BioColloid Science, Submission No.51, p.2.

manufacturing processes and if this is not achieved then the removal of those substances from the general waste stream.[25] Chemical industries have approached this by trading by-products with other companies with different specialisations.[26]

2.23 The NSW Joint Select Committee Upon Waste Management found that it could not be expected that industry would voluntarily pursue waste minimisation beyond what was within its own commercial interests. Accordingly, the NSW Parliamentary Committee considered that legislative backup in the form of effective monitoring and penalisation for non-compliance with the waste reduction targets would be necessary.[27] The NSW EPA, however, pointed out the difficulties with this approach as it would require access to comprehensive information on recovery rates which would be difficult without industry being compelled to provide this information.[28]

Packaging Debate

2.24 The *National Packaging Guidelines* were released in 1991 but there is no clear evidence that their adoption and implementation is having a significant impact in many areas. The Co-operative Research Centre for Waste Management and Pollution Control at the University of New South Wales is developing a national data base on the contribution of packaging to the waste stream and the success of

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[25] du Plessis, L (1993) 'Keeping toxics out of waste and securing the ash and residues'. *Incineration - an option for waste management*, Proceedings of a seminar on incineration of domestic waste. Commonwealth Environment Protection Agency, Pavillion Hotel, Canberra, 30 November 1993, p.54.

[26] Independent Panel on Intractable Waste (1992) *A Cleaner Australia Volume 2 Assessment of the Management Options*, 6 November 1992, p.32.

[27] Joint Select Committee Upon Waste Management, September 1993, NSW Parliament, p.11.

[28] Ibid, p.11.

strategies to reduce the waste.[29] The Industry Commission currently has a terms of reference on the packaging and printing industries.[30]

2.25 Packaging represents about 33 per cent of household waste by weight and considerably more by volume.[31] The Association of Liquidpaperboard Carton Manufacturers believes that focusing on the amount of packaging that is going to landfill is addressing only 10 per cent of the total waste problem and 70 per cent of this is food related.[32] The amount of packaging is decreasing on a per litre or per kilo basis but the amount of goods to be packaged is increasing, so further reductions may be difficult.[33]

2.26 The Committee was told that the real cost impact of waste and litter from packaging is around 0.1 cent per pack. It was suggested therefore, that taxes, levies, deposits or recycling targets in excess of this needed to be justified in terms of quantifiable benefit.[34] The environmental costs and benefits related to earlier stages of production must also be considered and not just the costs at the final consumption stage.[35] An increase in cost at the point of production of a package will increase each time the manufacturers margin, the wholesale margin, retail margin and sales tax are added.[36]

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[29] *Waste Management and Environment Magazine*, Volume 4, No.10, September 1993, p.24.

[30] Assistant Treasurer (1993) Press Release 19 October 1993, p.1.

[31] Department of Environment, Sport and Territories, Submission No.69, p.10.

[32] Rijswijk, Evidence, p.486.

[33] Association of Liquidpaperboard Carton Manufacturers Inc, Submission No.60, p.7, 21.

[34] Ibid, p.28.

[35] Hatch J and Mules T (1993) *The Economics of Packaging and the Environment.* The South Australian Centre for Economic Studies, April 1993, p.i.

[36] Rijswijk, Evidence, p.490.

2.27 Avcare Limited have developed a *Container Management Strategy* for containers in the crop protection and animal health industry, which is attempting to: reduce the number of containers requiring disposal; improve design to enable their cleaning; and develop a collection and recycling program.[37] Technologies are also being developed to turn liquid formulation into solid products to reduce the amount of packaging.[38] A voluntary levy is being charged for containers of one litre to 200 litre sizes sold by its members.[39] A system of reusable containers is also being developed.[40]

2.28 The NSW Farmer's Association's Agricultural Chemicals Container Management Policy is another such policy.[41] The Committee encourages State and Territory governments to co-operate in the development of a standard national container strategy for the agricultural and veterinary industries.

2.29 It was suggested that the introduction of a container deposit has been estimated for New South Wales to achieve return rates of 84-97 per cent, reduce solid waste by 4-6 per cent and total litter by 50 per cent.[42] The introduction of container deposit legislation was considered by the Friends of the Earth to be economically viable.[43]

2.30 The NSW Joint Select Committee Upon Waste Management considered that container deposit legislation might adversely affect the

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[37] Avcare Limited, Submission No.44, p.6.

[38] McGuffog, Evidence, p.549.

[39] Avcare Limited, Submission No.44, p.6.

[40] McGuffog, Evidence, p.550.

[41] Independent Panel on Intractable Waste 1992 *A Cleaner Australia, Volume 1 Findings and Recommendations*, 6 November 1992, p.19.

[42] Friends of the Earth, Executive Summary of 'Bringing Back Returnables - Container Deposit Legislation for NSW', p.1.

[43] Hopper P (1992) *Container Deposit Legislation for New South Wales Bringing Back Returnables.* Friends of the Earth (Sydney), Waste Minimisation Campaign, December 1992, p.23.

economic viability of kerbside collection of recyclables.[44] The Waste Contractors and Recyclers Association of New South Wales did not support container deposit legislation. It was pointed out that in the third quarter of 1992, kerb side collection of glass was 46.3 per cent which compared to 43 per cent on South Australia where there was container deposit system.[45]

2.31 Other States or Territories have not implemented container deposit legislation and some have rejected the concept.[46] For example, the Western Australian Government found CDL to be inefficient and preferred kerbside collections to individuals driving around to redeem deposits on beverage containers.[47]

Industry Responsibility

2.32 Industrial and building waste make about 54 per cent of Sydney's waste and therefore waste reduction measures must also be targeted to this area.[48] One example is the work by the Victorian EPA with the Department of Health and Community Services and the hospitals to reduce the amount of waste being incinerated though waste minimisation and segregation.[49] Industries and businesses can be required to pay for the weight or volume of waste, therefore the rising

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[44] Joint Select Committee Upon Waste Management, September 1993, NSW Parliament, p.46.

[45] Horswell, Evidence, p.376.

[46] Puplick C and Kirk A (1994) *Completely Wrapped. 1994 Update. Packaging, Waste management and the Australian Environment.* Packaging Environment Foundation in Australia, p.70.

[47] WA Department of Commerce and Trade and WA Municipal Association, *State Recycling Blueprint: A Plan to halve Waste to Landfill in Western Australia by the Year 2000*, June 1993, p.6.

[48] Toxic Chemicals Committee, Total Environment Centre, Submission No 36, p.2.

[49] Victorian Government, Submission No.83, Attachment B, p.2.

costs of waste disposal to industry have encouraged the investigation of waste minimisation strategies.[50]

2.33 The Friends of the Earth consider that industries should take full responsibility for waste products and the packaging they produce. They provide the following list:

- This responsibility must include: containers; packaging; paper; furniture; white-goods; motor vehicles; and selected hazardous materials;
- In keeping with recent legislation in Germany, industry must finance collection and reuse/recycling/disposal of products and packaging;
- Container deposit legislation (CDL) must be introduced to achieve high return rates. CDL must apply initially to drink containers and be extended to other containers and products. Point of sale is the preferred return path although industry may establish alternative collection systems; and
- Full responsibility for products and packaging will encourage a shift towards products and packaging that are durable, reusable or recyclable.[51]

2.34 The Committee was told that care must be taken in requiring industry to recycle its packaging as this may mean a switch from other types of packaging which have environmental and commercial benefits.[52] New products should not come on to the market unless they are safe, environmentally sound and have an acceptable disposal route.[53]

2.35 The Victorian EPA supported the cradle-to-grave concept and have developed the *Statutory Industrial Waste Management Policy*

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[50] Creating Incentives *The Economist* May 29th 1993, pp.19-20, p.19.

[51] Denlay J (1993) Waste minimisation - the sustainable option' *Incineration an option for waste management.* Proceedings of a seminar on incineration of domestic waste. Commonwealth Environment Protection Agency, Pavillion Hotel Canberra, 30 November 1993, p.44.

[52] Boerner C and Chilton K (1993) *Recycling's demand Side: Lessons from Germany's "Green Dot".* Center for the Study of American Business. Contemporary Issues Series 59, August 1994, p.10.

[53] Hungerford, Evidence, p.535.

(Waste Minimisation) 1990.[54] The *Environment Protection (Resource Recovery) Act 1992* established a Recycling and Resource Recovery Council, a Waste Management Council, Industry Waste Reduction Agreements and a Landfill Levy.[55] New South Wales will also be introducing industry waste reduction plans.[56]

2.36 Incentives are also being offered in the form of the Victorian EPA's *Waste Minimisation Program Clean Technology Incentive Scheme* which lend funds for the capital cost of installing no-waste or low-waste technology.[57]

2.37 The Victorian Government has introduced a system of Industry Waste Reduction Agreements which provide industry with potential savings, market opportunities and an improved public profile.[58] Agreements are in place for the newsprint and aluminium can industries and are anticipated for the glass packaging, plastics, liquid paperboard, fast food, major retailers, building, road construction, green waste and personal hygiene industries.[59]

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[54] Nan Tie M (1993) 'What resource recovery legislation in Victoria means to waste management' *Incineration an option for waste management* Proceedings from a seminar on the incineration of domestic waste. Commonwealth Environment Protection Agency, Pavillion Hotel, Canberra, 30 November 1993, p.12.

[55] Ibid, p.13.

[56] *Environment Management*, State News, New South Wales, August 1994, p.7.

[57] Independent Panel on Intractable Waste (1992) *A Cleaner Australia Volume 2 Assessment of the Management Options*, 6 November 1992, p.32.

[58] Nan Tie M (1993) 'What resource recovery legislation in Victoria means to waste management' *Incineration an option for waste management.* Proceedings of a seminar on the incineration of domestic waste, Commonwealth Environment Protection Agency, Pavillion Hotel Canberra, 30 November 1993, p.15.

[59] Ibid, p.16.

Householders Responsibility

2.38 Households pay a flat rate for waste collection so there is no incentive to reduce the amount or minimise their waste or to recycle.[60] The Committee was given the example of the introduction of 240 litre garbage bins at the City of Heidelberg which increased the waste collected from 12 000 to 20 000 tonnes in six months.[61] Reducing the size of the bins will not necessarily reduce the amount of waste getting into the system, as it will go to the recycling and waste stations or back lanes or some other way.[62]

2.39 The Friends of the Earth suggest a number of ways that household waste charges can be restructured to promote waste minimisation:

- households must be charged a variable rate for mixed waste by weight or volume;
- variable charges must be structured so that households that fully source separate pay no more than they pay now for waste collection; and
- organic collections from households must be subsidised by mixed waste collection.[63]

2.40 The Committee appreciates the logistical difficulties in introducing changes to existing waste charging systems and collection methods. The Committee encourages local councils to consider all the alternatives that might provide incentives for householders to minimise or recycle their waste as opportunities arise.

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[60] Creating Incentives *The Economist* May 29th 1993, pp.19-20, p.19.

[61] van Gemert, Evidence, p.619.

[62] Ibid, p.620.

[63] Denlay J (1993) 'Waste minimisation - the sustainable option' *Incineration an option for waste management.* Proceedings of a seminar on incineration of domestic waste. Commonwealth Environment Protection Agency, Pavillion Hotel, Canberra, 30 November 1993, p.45.

Reuse

2.41 The Committee also supports the implementation of effective programs which will encourage all sectors of the community to reuse, repair and maintain products. Successful reuse schemes include the retreading of tyres, the collection of unwanted clothing, furniture, appliances and other goods.[64] Some councils allow the scavenging of landfills.[65] In Canberra, 'Revolve' is a community based non-profit organisation which salvages materials from landfills and the funds from the sales of this material is used for generating employment.[66]

2.42 One aspect in relation to the repair and reuse of items which needs further debate is the concept of at what stage does repair give way to the replacement by more environmentally efficient products. The Committee's inquiries reveal that there have been no seminars, conference or substantial public debates on this aspect of waste management.

Recycling

2.43 As part of the *National Strategy on Ecologically Sustainable Development* the Council of Australian Governments agreed to:

> encourage greater levels of involvement by industry in recycling activities, and have recognised the contributions already made by industry in this area ... continue action to promote a greater level of household recycling and to minimise the production of waste from households, while ensuring the implications for energy use and the reduction of greenhouse gas emissions are considered.[67]

2.44 The Australian and New Zealand Environment and Conservation Council (ANZECC) have developed recycling strategies such as the

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[64] Department of Environment, Sport and Territories, Submission No.69, p.17.

[65] Ibid, p.18.

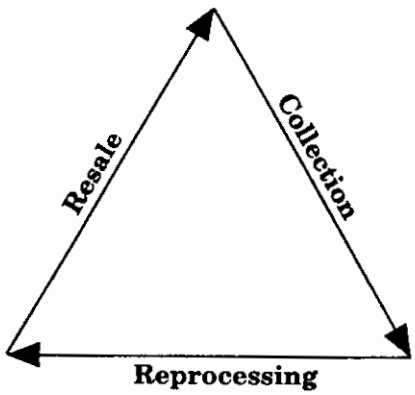
[66] Ibid, p.18.

[67] *National Strategy on Ecologically Sustainable Development*, December 1992, p.76.

Waste Lubricating Oil, Used Motor Vehicle Tyres: Recycling and Reuse (1991), the *National Packaging Guidelines* (1991) and the *National Kerbside Recycling Strategy* (1992) and a *Report on the Establishment and Implementation of a National Kerbside Recycling Strategy.*[68]

2.45 There are two major dimensions to the principle of recycling. The first is the reuse of materials and the second is the processing of materials or products to produce energy or alternative materials. The Committee considers that reuse should be given high priority and considers both options to be preferable to final disposal.

2.46 There are three aspects to the recycling process.



Collection

2.47 A great deal of progress has already been made in some areas in relation to the collection of materials for recycling. For example, over 90 per cent of Victorian metropolitan municipalities and 50 per cent of rural municipalities have kerbside collections for glass and aluminium, and some collect newspapers, cardboard and PET plastic.[69] Victoria has one of the highest collection rates for any voluntary system in the

[68] ANZECC (1992) *Report on the Establishment and Implementation of a National Kerbside Recycling Strategy.* National Kerbside Recycling Taskforce, June 1992.

[69] Victorian Government, Submission No.83, Attachment A, p.3.

world for those materials.[70] A recent report has indicated that in Victoria that local councils are moving towards less frequent kerbside collections to drop off centres because of doubt about the cost effectiveness of this service.[71]

2.48 Some industries have also been able to recycle a substantial proportion of their waste materials. It may be difficult to obtain quantitative information on the success of these operations. The commercial in confidence nature of the operations of companies and of private waste recycling companies would make it difficult to obtain reliable information on waste recovery rates and volumes of recyclable materials used in the production of new goods.[72]

Reprocessing

2.49 Some successful examples were brought to the attention of the Committee. CSIRO and Pacific Power have developed a new process which can regenerate used transformer oils and remove the PCBs.[73] There is an estimated $240 million worth of transformer oil in use in Australia and $20 billion worldwide.[74] In Australia it is estimated that oil valued at $60 million is contaminated with PCBs.[75]

2.50 The EnvIRONment Process uses steelworks dust and sewage sludges to produce cast iron and zinc oxide.[76] This type of recycling has the benefits of conserving the natural resources; cleaning up the

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[70] Robinson, Evidence, p.663.

[71] Puplick C and Kirk A (1994) *Completely Wrapped 1994 Update packaging, Waste Management and the Australian Environment*, Packaging Environment Foundation of Australia, p.58.

[72] Joint Select Committee Upon Waste Management, September 1993, NSW Parliament, p.11.

[73] Ekstrom, Evidence, p.426.

[74] Ibid, p.426.

[75] Ibid, p.426

[76] Illawarra Technology Corporation Ltd, Submission No.22, p.4.

environment; and utilising an environmentally safe waste disposal option. It reduces the amount going to landfill and does not impact negatively on the community.[77]

2.51 The philosophy behind the EnvIRONment process is that some materials considered to be waste and a nuisance by themselves can be resources and have a complementary utility. Jarosite (waste from a zinc refinery) could be one such process. The Chairman took this question up with Jarosite but no satisfactory response had been received by the time this report was finalised.

2.52 EMIAA considered that governments had paid inadequate attention to the reprocessing of recycled materials, and economic intervention through incentive or subsidy could be used to achieve certain environmental goals.[78] The Committee was told that the cost of raw materials should also reflect the scarcity of the resource and the scarcity of facilities to deal with the product.[79]

Resale

2.53 One of the major problems that is facing the recycling of materials is the fragile nature of existing markets and the absence of markets for many materials. Some work is already being done in this area. For example, the Queensland Government has allocated $80 000 for the *Waste Exchange Register* which is a shopping list for recycling companies.[80] Funds have also been allocated for a *Recycling Grant Scheme* and a *Recycling Industry Incentive Scheme.*[81]

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[77] Ibid, p.13-14.

[78] Cole, Evidence, p.524.

[79] Friends of the Earth, Submission No.48, p.9.

[80] *Greenweek*, 14 September 1993, p.6.

[81] Puplick C and Kirk A (1994) *Completely Wrapped 1994 Update. packaging, Waste Management and the Australian Environment.* Packaging Environment Foundation of Australia, p.59.

2.54 The City of Heidelberg recycled 25 per cent of its waste. However, it was pointed out that 20 per cent of it did not have long term viable markets.[82] The markets for paper and cardboard were saturated and there are problems with the green waste.[83] The Victorian EPA admitted there were significant problems in terms of oversupply and believed that 30-50 per cent of materials going to landfills could be used in other ways.[84]

2.55 Over the last few years, all recycling industries have lowered their prices for post-consumer materials and many have imposed stricter sorting requirements.[85] One approach is to have a differential costs system where it is cheaper to dispose of separated wastes. For example, sorted coloured glass is two to three times the value of mixed glass. Other possible measures were a disposal tax on new tyres; and a cost differential for sorted and unsorted building waste.[86]

2.56 The Committee was told that by definition, at-source recycling should be cheaper but it was not done well enough.[87] Dr Lohning told the Committee that unless there was at least 95 per cent participation in kerb-side recycling it was probably much more effective to do it in a central plant.[88]

2.57 The EMIAA had suggested that the introduction of recycling programs in many areas has not resulted in a significant proportion of the waste stream being recycled.[89] They pointed out that much of the

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[82] van Gemert, Evidence, p.613.

[83] Ibid, p.613.

[84] Robinson, Evidence, p.663.

[85] Woods, Evidence, p.323.

[86] Toxic Chemicals Committee of the Total Environment Centre Inc, Submission No.36, p.2.

[87] Greay, Evidence, p.139.

[88] Lohning, Evidence, p.277.

[89] Environmental Management Industry Association of Australia Limited, Submission No.63, p.8.

material that consumers believe is being recycled was sent to landfill because the costs of recycling were prohibitive.[90]

2.58 This is not only a problem in Australia. The example was also given of recycling collections in Telheim, Germany, where collection of recyclables were separate from putrescibles and green waste but both containers went to the same landfill despite landfill costs of about $300 per tonne.[91] It was pointed out to the Committee that these high landfill costs were not enough disincentive for authorities to find alternatives.[92]

2.59 In rural New South Wales, many recycling programs have closed because of the costs of transport.[93] To compensate for some of these costs, limited transport subsidies are provided by the glass and paper industries.[94] It was suggested that this could be partly addressed through the co-ordination of the rail system when recycled materials could be moved to other areas in empty wagons.[95]

2.60 The future of recycled products will depend to some extent on the capacity to find markets to enable the recycling program to be economic. Strategies on recycling should consider the demand for value added products as well as the supply of recycled materials and whether the markets can afford the products.[96] The Committee was told that:

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[90] Ibid, p.8.

[91] van Gemert, Evidence, p.626.

[92] Ibid, p.627.

[93] Woods, Evidence, p.333.

[94] Joint Select Committee Upon Waste Management, September 1993, NSW Parliament, p.3.

[95] Woods, Evidence, p.333.

[96] Environmental Management Industry Association of Australia Limited, Submission No.63, p.14.

> The clear evidence is that the markets for many recycled products are at best fragile and often non-existent.[97]

Environmental Efficiency of Recycling Materials

2.61 There is a general perception that recycling is an environmentally benign process that in all cases saves resources. It has been pointed out that:

> Recycling, however, is a manufacturing process like any other: raw material must be collected, prepared for processing and manufactured into marketable goods. Although the process of recycling conserves some resources, it consumes others. The process of recycling requires energy, water, and often, chemical resources - and, of course, produces some waste.[98]

2.62 There is a general lack of knowledge about the environmental efficiencies of recycling various materials. The Western Australian Environment Protection Authority showed that in some cases, significant energy savings could be made through recycling material as compared with the use of raw materials.[99] Studies such as the *CSG/Tellus Packaging Study* have also shed more light on this area.[100] The New South Wales Environment Protection Authority is currently looking at the cost/benefits of recycling.

2.63 Some figures are becoming available which indicate a positive result compared with final disposal options. For example, recycling waste paper can save up to five times as much energy as can be recovered through incineration, and recycling high density polyethylene

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[97] City of Heidelberg, Submission No.33, p.2.

[98] Boerner C and Chilton K (1993) *Recycling's Demand Side: Lessons from Germany's "Green Dot"*. Center for the Study of American Business. Contemporary Issues Series 59, August 1993, p.16.

[99] Environment Protection Authority, Western Australia (1989) 'Recycling Cost Analysis and Energy Balance' *EPA Bulletin No.409*, December 1989.

[100] Tellus Institute (1992) *CSG/Tellus Packaging Study*, Volume 1, Prepared for The Council of State Governments and the US Environmental protection Agency, May 1992.

saves almost twice as much energy.[101] More information is needed for other products and for Australian conditions. This type of study, however, sheds little light on the environmental costs of recycling or not recycling materials compared to the cost of production from raw materials.

2.64 One of the problems in considering the energy efficiencies is that local decision makers focus on local benefits rather than the energy saved by the country as a whole.[102] It was also pointed out that a milk carton has to be transported from Perth to Nowra to be recycled and the original raw material had to travel all the way from Sweden to Australia.[103] Plastic soft drink bottles in Darwin are being transported to Albury to be shipped to the United States to be turned into carpet filling.[104]

2.65 More informed policy decisions can be made as further information becomes available about the relative energy efficiencies of various options. The Fraunhoffer Institute found that in many respects, there was no overall environmental advantage in refillable glass compared to cartons.[105] The Committee was told that a localised refilling system is consistent with a smaller population centre.[106]

Economics of Recycling

2.66 The City of Heidelberg recycling and waste station had a throughput of 65 000 tonnes five years ago and this has now dropped

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[101] Cartmel, Evidence, p.403.

[102] Ibid, p.403.

[103] Denlay, Evidence, p.503.

[104] Denlay J (1993) 'Waste minimisation - the sustainable option' *Incineration an option for waste management.* Proceedings from a seminar on incineration of domestic waste. Commonwealth Environment Protection Agency, Pavilion Hotel Canberra, 30 November 1993, p.39.

[105] Rijswijk, Evidence, p.487.

[106] Denlay, Evidence, p.512.

to 12 000 tonnes.[107] Mr van Gemert told the Committee that the technology of household garbage collection has made it more economic to bypass recycling but as the cost of landfill and transport go up, the recycling and waste station will come to the fore again.[108]

2.67 Industry submissions to the NSW Joint Select Committee Upon Waste Management argued that long term subsidies for recycling did not create anything tangible and worked against waste minimisation by hiding the true cost of waste disposal.[109] It was argued that these subsidies are inequitable and inflationary method of funding collection.[110]

2.68 The Committee was told by the Association of Liquidpaperboard Carton Manufacturers Inc that:

> Kerbside recycling is a high cost method of [r]educing waste and much of this cost is hidden in the subsidies paid by industry through artificially set prices for collected materials.[111]

2.69 In the case of household waste the cost of collection and sorting for recycling is not covered by the price received from companies for the material and in some cases councils have to pay for the removal of recycled materials.[112] The Local Government and the Shires Associations of New South Wales support the introduction of a scheme similar to that in Germany in which industry funds or takes over local government kerbside recycling operations.[113]

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[107] van Gemert, Evidence, p.623.

[108] Ibid, p.623.

[109] Joint Select Committee Upon Waste Management, September 1993, NSW Parliament, p.28.

[110] Association of Liquidpaperboard Carton Manufacturers Inc, Submission No.60, p.32.

[111] Ibid, p.8.

[112] Second Time Around *The Economist* May 29th 1993, pp.12-19. p.17.

[113] Local Government Association of New South Wales and Shires Association of New South Wales *A response to the Minister for the Environment's Green*

2.70 Recycling schemes were being driven as a disposal option rather than a resource need.[114] The cost of collection for recycling outweighed the economic gain for the sale of the recovered material. For example, PET bottles cost $1200 to collect and fetch $600 per tonne, while with paper the ratio is $90:20.[115] It was pointed out that ACI Petalite pay $700 per tonne, have a recycling rate of 35-40 per cent, run a profitable business and get the kudos from that investment.[116]

Paper Recycling

2.71 The New South Wales Government has banned all loads of garbage with 25 per cent waste paper content from transfer stations and landfills and is forcing more councils to provide a weekly service without developing ongoing and economic markets.[117]

2.72 Of the one million tonnes of paper recycled in Australia, 85 per cent is from commercial-industrial sources. The recycled paper market is going backwards.[118] The excess supply of recycled newsprint is exported until markets are created in Australia.[119] There is an over supply of recycled paper world wide.[120]

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paper on waste management, Executive Summary, March 1993, p.iv-v.

[114] Healey Management Group, Submission No.6, p.4.

[115] Horswell, Evidence, p.374.

[116] Brotherton, Evidence, p.699.

[117] Johns C (1993) *Proven Strategies for Overcoming the Difficulties of Collection and Processing Recyclable Products*, p.2.

[118] Denlay, Evidence, p.508.

[119] Puplick C and Kirk A (1994) *Completely Wrapped 1994 Update packaging, Waste Management and the Australian Environment.* Packaging Environment Foundation of Australia, p.59.

[120] Johns C (1993) *Proven Strategies for Overcoming the Difficulties of Collection and Processing Recyclable Products*, p.2.

2.73 Some measures are being taken to assist the market for recycled papers. For example, the Queensland Government requires all government agencies to use recycled paper for at least 50 per cent of their requirements and paper collection facilities are also used.[121]

2.74 There is a need for new markets and uses to be developed. One such project is the worm farms being trialled at Braidwood (NSW) and Weston Creek (ACT) to digest paper. It is considered that the excrements would form a quality fertiliser. Initial tests are promising and this could be an appropriate reuse of paper in rural areas where other recycling facilities are not available.[122]

Plastics Recycling

2.75 Australians consume about 1.2 million tonnes of plastic annually which is equivalent to 70 kg per person.[123] This includes plastics used in items such as motor vehicles, computers, television sets, durable household items, building and construction, electrical, electronic and plumbing applications which are longer term.[124]

2.76 Polyethylene plastics are currently collected in quantity through kerbside collection in Victoria but there are limited viable markets for recycling this material.[125] The recycling of plastics is difficult because

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[121] Puplick C and Kirk A (1994) *Completely Wrapped 1994 Update packaging, Waste Management and the Australian Environment.* Packaging Environment Foundation of Australia, p.59.

[122] Mr Gerard Gillespie, informal discussion at the Seminar on *Managing the Environmental Fate of Substances.* A Seminar examining the best current practices and emerging opportunities for managing the impact of substances on the environment. ACT Office of the Environment and the Canberra Division of the Institution of Engineers, Canberra, 19 July 1994.

[123] Pesudovs D (1993) 'The role of plastics in the waste to energy stream' *Incineration an option for waste management.* Proceedings from a seminar on Incineration of domestic waste, Commonwealth Environment Protection Agency, Pavillion Hotel Canberra, 30 November 1993, p.113.

[124] Ibid, p.115.

[125] Victorian Government, Submission No.83, p.2.

of the mixing of the different polymeric types and grades reduces the performance characteristics of the products.[126] A mixture of different types of plastics has unpredictable performance characteristics and has little commercial value.[127]

2.77 If the plastics are contaminated or cannot be separated into the pure form then there is more energy spent in the recovery of useable quantities than is saved by reusing the material.[128] There is also public perception regarding the acceptability of plastics which cannot be guaranteed to be free of contaminants.[129] Often the price of labour exceeds the value of the production of the item from raw material; industries prefer to use the raw material because it is likely to be of more consistent quality and is a dependable supply; and waste materials may be contaminated.[130]

2.78 Some industries are addressing the problems associated with the recycling of plastics. For example, 2 litre plastic milk bottles originally had a polypropylene top, polyethylene bottle and paper label but have now been redesigned to be only polyethylene compatible material.[131] Industry is now looking at other products such as containers for washing detergents.[132]

2.79 The crop protection and animal health industry has been looking at ways of minimising environmental contamination from empty containers and reducing the level of packaging.[133] The only acceptable

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[126] Pesudovs, Evidence p.751.

[127] Plastics Industry Association Inc, Submission No.59, p.1.

[128] Toxic Chemicals Committee, Total Environment Centre Inc, Submission No.36, p.5: Second Time Around *The Economist* May 29th 1993, pp.12-19, p.18.

[129] Avcare Limited, Submission No.44, p.9.

[130] Second Time Around *The Economist* May 29th 1993, pp.17-19, p.17.

[131] Pesudovs, Evidence, p.754.

[132] Ibid, p.755.

[133] Avcare Limited, Submission No.44, p.1.

and practical disposal option for plastics is to bury these in an approved landfill.[134] Much of this waste is currently being stored on farms.[135] The other major disposal option, which is not recommended, is by burning.[136] The possibility of using these plastic containers as fuel in cement kilns is being investigated.[137]

2.80 Commercial operations are being developed overseas for the conversion of polymeric materials, although Australia is not involved.[138] The economics of these catalytic conversion and pyrolysis processes is marginal and is dependent on the cost of landfill and waste to energy combustion.[139]

2.81 The Plastics and Chemicals Industry Association Inc have participated in the development of a *Plastic Coding System* to assist in recycling, the setting of national standards, formulation of the *National Recycling Plan* and the elimination of chlorofluorocarbons in line with the Montreal Protocol.[140]

2.82 It is interesting to note, however, that Germany has found it necessary to dump its excess plastics wastes in Indonesia after the introduction of the Duales System Deutschland.[141]

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[134] Ibid, p.1.

[135] Ibid, p.2.

[136] Ibid, p.6.

[137] Ibid, p.1.

[138] Plastics Industry Association Inc, Submission No.59, p.5.

[139] Ibid, p.5.

[140] Ibid, p.9.

[141] Puplick C and Kirk A (1994) *Completely Wrapped 1994 Update. Packaging, Waste Management and the Australian Environment.* Packaging Environment Foundation of Australia, p.9.

Recycling other Materials

2.83 The Wollongong City Council pointed out that the overwhelming emphasis on packaging materials does not encourage councils to recycle material which forms a more significant part of the waste stream such as wood waste, car bodies and building refuse.[142] The Local Government and Shires Associations of New South Wales support the introduction of an advanced disposal fee for durable and bulky items to encourage manufacturers to design ease of recycling into their products.[143] Tasmania also proposed a deposit scheme for pesticide containers, oil, tyres, batteries, automobiles and white goods.[144]

2.84 For larger items such as cars, a fee could be charged with the registration of the vehicle so that at the end of its useful life, it could be taken to a metal company to be recycled and the fee could then be refunded.[145]

2.85 The cement industry is offering a number of options for the recycling of materials in the production of cement. Waste can be used as a supplementary fuel in the kilns and as fillers in cement. This is discussed in more detail in Chapter 6.

2.86 Pacific Dunlop are also reusing old tyres to produce rubber powder which can be used in carpet underlays, high performance roads and other products. It is estimated that this will reduce Australia's rubber imports by $50 million per annum.[146]

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[142] Joint Select Committee Upon Waste Management, September 1993, NSW Parliament, p.27.

[143] Local Government Association of New South Wales and the Shires Association of New South Wales, *A response to the Minister for the Environment's Green Paper on waste management, Executive Summary* March 1993, p.vi.

[144] Department of Environment and Planning (1992) *Tasmanian Solid Waste Management Policy*: Position Paper, Hobart June 1992.

[145] Kiernan, Evidence, p.273-274.

[146] Total Environment Centre (1993) *Sydney's Waste Crisis Proposals for Resolution.* Submission by Total Environment Centre to the NSW Parliamentary Joint Select Committee Upon Waste, January 1993, p.22.

2.87 It became evident from the Committee's inquiries that when a number of industries are established in areas which use tyres as a cheap source of energy, that the supply will not be able to meet the demand. The Committee believes that if this is the case governments should intervene to ensure that enterprises which reuse the materials for other products should be given preference over the use of tyres as a cheap source of fuel.

2.88 Arsenic, as an element, cannot be incinerated or chemically broken down. Trials are currently being conducted in Victoria to recycle arsenic compounds to the timber treatment industry.[147]

2.89 A substantial amount of used construction material can be recycled and resold as demolition material.[148] These materials can be reprocessed as can products such as sand, roadbases and aggregates.[149]

Organic Waste Stream

2.90 An estimated 5 million tonnes of organic waste are disposed of nationally each year, which equates to 34 per cent of the total waste stream.[150] A reduction in the amount of organic wastes going to landfill has the potential of significantly reducing the amount of waste in the context of achieving the 50 per cent target for total waste. A national target of 20 per cent reduction in organic materials going to landfill by 1995 has been adopted by the Commonwealth.[151]

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[147] Victorian Government, Submission No.83, p.5.

[148] Total Environment Centre (1993) *Sydney's Waste Crisis Proposals for Resolution.* Submission by Total Environment Centre to the NSW Parliamentary Joint Select Committee Upon Waste, January 1993, p.24.

[149] Ibid, p.26.

[150] Denlay J (1993) *Guidelines for Composting: Return it to the Earth*, Friends of the Earth, Sydney.

[151] Commonwealth Environment Protection Agency 1992 *National Waste Minimisation and Recycling Strategy*, AGPS, p.25.

2.91 The disposal of gardening materials has been banned in some parts of the USA and Europe.[152] Environmental Solutions International Ltd believed that legislation at the Commonwealth and State levels was needed to encourage the reuse and recovery of the organic fraction of municipal solid waste.[153]

2.92 Organic waste can make up 50 per cent of waste in New South Wales and 30 per cent of industrial waste.[154] Recommendation 40 of the NSW Joint Select Committee Upon Waste Management would prohibit the disposal of garden waste to landfill from January 1997.[155]

2.93 There has been considerable difficulty in finding viable markets for organic waste in the quantities available. For example, the City of Heidelberg provides timber free of charge, to a local company where it is shredded and sold back to the council or to nurseries for ground cover.[156] The Council also pays half of the transport costs.[157] The Council described the market as fickle because they do not have any other options.[158]

2.94 The recycling of organic waste incurs high collection and processing costs but produces a low value product.[159] It has been suggested that in Australia this approach has been slow to be

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[152] Local Government Association of New South Wales and Shires association of New South Wales *A response to the Minister for the Environment's Green Paper on waste management, Executive Summary,* March 1993, p.vi.

[153] Bridle, Evidence, p.116.

[154] Toxic Chemical Committee, Total Environment Centre Inc, Submission No.36, p.3.

[155] Joint Select Committee Upon Waste Management, NSW Parliament, September 1993, p.62.

[156] van Gemert, Evidence, p.621.

[157] Ibid, p.621.

[158] Ibid, p.622.

[159] Friends of the Earth, Executive Summary of '*Return it to the Earth! - Guidelines for Composting in Australia*', p.2.

implemented because of the current low cost of disposal of these materials at landfill.[160]

2.95 The Darwin City Council has an extensive composting program which is more cost effective than recycling, and by May 1993 had reduced the amount going to landfill by 11 per cent.[161]

2.96 Composting can produce a useful organic fertiliser.[162] Woody and garden waste can be used as soil conditioners and cover, while some organic waste can be used as fertiliser.[163] Most organic waste can be composted or mulched, but the quality of the product must be regulated.[164] Sewage sludge can be added as a source of nitrogen and phosphorus if it does not contain unacceptable levels of contaminants.[165]

2.97 It is necessary to introduce standards for composting to avoid the potential contamination of land by heavy metals and organochlorines.[166] Holland, Austria and Germany have introduced regulations which limit the metal and organic toxins in compost for specific uses, with the highest grade for market gardens and the lowest for cover in landfill sites.[167]

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[160] Ibid, p.2.

[161] Bureau of Industry Economics (1993) *Waste Management and Landfill Pricing*, Occasional Paper 12, AGPS, Canberra, pp.11-12.

[162] Nu-Soil, Submission No.47, *Council Garbage Treatment The Nu-Soil Way*, p.2.

[163] Toxic Chemicals Committee, Total Environment Centre Inc, Submission No.36, p.3.

[164] Ibid, p.2.

[165] Ibid, p.2-3.

[166] Ewald, Evidence, p.440.

[167] Toxic Chemicals Committee, Total Environment Centre Inc, Submission No.36, p.3.

2.98 The City of Heidelberg has provided a subsidised compost bin to consumers for the past five years and believed that this has created an increased community awareness of waste management.[168] The Council has found, however, that this has not greatly contributed to the minimisation of waste strategies.[169]

2.99 The time taken for the composting process can be greatly reduced by the addition of inoculums such as the Nu-Soil formula.[170] The inoculum is a mixture of microorganisms and enzymes in a medium.[171] This technique has been approved by the US EPA and is being used in Canada and Holland.[172] The carbon/nitrogen ratio is important, and strict quality controls must be used as well as the introduction of a biological 'activator'.[173]

2.100 Odour can be a major problem in the composting of materials and this may cause problems in residential areas.[174] The Committee was told the Nu-Soil technique can be used on sewage and garbage and removes odours almost immediately.[175]

2.101 The Committee was told that open air composting should not be permitted in the vicinity of large cities because of its contribution to air pollution levels.[176] Under aerobic conditions composting materials produce carbon dioxide and small amounts of sulphur compounds and

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[168] van Gemert, Evidence, p.618-619.

[169] Ibid, p.619.

[170] Nu-Soil, Submission No.47, p.3.

[171] Nu-Soil, Submission No.47, *Rapid Composting*, p.17.

[172] Nu-Soil, Submission No.47, p.3.

[173] Nu-Soil, *Council Sewerage Treatment the Nu-Soil Way*, Submission No.47, p.4.

[174] Healey Management Group, Submission No.6, p.6.

[175] Nu-Soil, Submission No.47, p.3.

[176] Toxic Chemicals Committee, Total Environment Centre Inc, Submission No.36, p.5.

nitrates.[177] Under anaerobic conditions methane and carbon dioxide, hydrogen sulphide and ammonia are released.[178]

2.102 Some of this material can be converted into biogas which is up to 60 per cent methane and which can be used as an energy source.[179] Biogas can be burned to produce energy but the concentration of impurities can exceed air emissions standards and must be removed from the exhaust fumes.[180] However, compost can reduce the amount of nitrous oxide emitted from the use of nitrogenous fertilisers, which have a greater greenhouse impact than either methane or carbon dioxide.[181] The Committee was told that all too often the gaseous fuels are flared and not used.[182]

2.103 If open air composting is conducted, it is essential that the leachate be prevented from penetrating to aquifers and rivers because of the contamination by heavy metals, other inorganic impurities and organic toxins such as PCB, PCP, organochlorine pesticides and DDT.[183] In Madrid, the leachate from the composting process is being re-used in the municipal incinerator as part of the control mechanism.[184]

2.104 The Committee was told that in smaller communities composting is technically and commercially viable, while in large cities compost products can quickly swamp the market.[185]

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[177] Ibid, p.4.

[178] Ibid, p.4.

[179] Ibid, p.3.

[180] Ibid, p.4.

[181] Department of Environment, Sport and Territories, Submission No.69, p.19.

[182] Bridle, Evidence, p.126.

[183] Toxic Chemicals Committee, Total Environment Centre Inc, Submission No.36, p.5.

[184] Gutteridge, Evidence, p.313.

[185] Bridle, Evidence, p.117.

2.105 The Local Government and Shires Associations of New South Wales suggested the establishment of a Bio-Waste Action Program based on the Dutch model.[186] The objectives of this program would encompass the creation of stable markets and sufficient composting capacity and ensure that households had access to garden material collection.[187] If composting programs are to succeed then reliable long term markets must be developed.[188]

2.106 Environmental Solutions International Ltd said that there were numerous other outlets for the green fraction other than incineration or landfill such as the ill-fated neutralysis process, oil from sludge process and refuse derived fuel.[189] The production of a high density liquid fuel has an environmental advantage.[190] The Committee suggests that local councils be encouraged to look at alternative technologies and that this information be made available in a user friendly form.

Burning of Green Waste

2.107 The concern in relation to the use of backyard incinerators has resulted in their prohibition by most state and local governments.[191] The Committee was, however, alarmed to learn that the Shoalhaven Council was still burning substantial quantities of composting material. Stockpiles containing a variety of vegetation are built approximately 15 metres in diameter.[192]

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[186] Local Government Association of New South Wales and Shires Association of New South Wales, *A response to the Minister for the Environment's Green Paper on waste management, Executive Summary,* March 1993, p.vi.

[187] Ibid, p.vi.

[188] Department of Environment, Sport and Territories, Submission No.69, p.19.

[189] Bridle, Evidence p.117-118.

[190] Ibid, p.126.

[191] Department of Environment, Sport and Territories, Submission No.69, p.23.

[192] Strachan, Evidence, p.242.

2.108 The Committee was told that all the councils south of Shoalhaven down to the Victorian border are currently burning off.[193] In Victoria, the burning of dried vegetative material is permitted in a small number of pit burners licensed by the EPA but otherwise the burning of wastes at landfills is prohibited throughout Victoria.[194]

2.109 The Shoalhaven City Council justified its procedure by pointing out that:

> the burning of vegetation contributes to the greenhouse effect, it is inconsistent to have government policies that allow the backburning of forested areas surrounding waste disposal sites, and backyard burning by residents, yet prohibits burning of vegetation in a controlled fashion on waste disposal sites.[195]

2.110 The NSW Environment Protection Authority has requested that councils look at alternative technologies for the disposal of vegetation waste.[196] The State Government has not suggested any alternatives.[197] In response to this request, the Shoalhaven City Council called for expressions of interest to shred and process the vegetation waste.[198] Some material was already being recycled as firewood and sawdust.[199]

2.111 The Council anticipated an additional cost of $300 000 per year to process this waste.[200] It put forward the argument that interfering with the costs of one disposal option encouraged the community to seek other options such as backyard burning, placing it in the garbage so it

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[193] Strachan, Evidence, p.246.

[194] Victorian Government, Submission No.83, p.3.

[195] Shoalhaven City Council, Submission No.39, p.1.

[196] Ibid, p.1.

[197] Strachan, Evidence, p.247.

[198] Shoalhaven City Council, Submission No.39, p.1.

[199] Strachan, Evidence, p.245.

[200] Shoalhaven City Council, Submission No.39, p.1.

ended up in landfill or illegally dumping it.[201] The Council considered that the standards that applied to urban areas were not necessarily appropriate to rural councils.[202]

2.112 The Committee encourages all governments to investigate new markets for green waste as a matter of urgency. Further, the Committee urges local councils to seriously consider the available alternatives and any innovative proposals for treating green waste as a matter of priority.

Recycling in the Future

2.113 Some studies now show that the councils that recycle the most material also produce the most waste.[203] The problem does not appear to be the need to convince the community of the need to recycle but the challenge is to develop markets for the recycled materials.[204] The NSW Waste Recycling and Processing Service estimated that markets needed to be found for 1.5 million tonnes of recycled material for NSW alone.[205] Government agencies could be encouraged to give preference to recycled products.[206]

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[201] Strachan, Evidence, p.245.

[202] Ibid, p.246.

[203] Joint Select Committee Upon Waste Management, September 1993, NSW Parliament, p.26.

[204] Second Time Around *The Economist* May 29th 1993, pp.12-19, p.17.

[205] Association of Liquidpaperboard Carton Manufacturers Inc, Submission No.60, p.8.

[206] Toxic Chemicals Committee, Total Environment Centre Inc, Submission No.36, p.3.

2.114 Research is needed into the technical barriers to the use of recycled products.[207] The Association of Liquidpaperboard Manufacturers listed the barriers to recycling as funding, length of current contracts, council resistance to adding extra materials, council boundary changes, archaic collection methods, unstable markets and public attitudes.[208]

2.115 The correct charging of waste disposal options makes the options higher up the hierarchy become more feasible. The Committee was told that:

> There is no point in ending up with some artificial government-controlled structure that actually leads to recycling for its own sake and imposes a higher social cost on the community than by disposing of the waste in some other way.[209]

2.116 Raising the cost of waste disposal may be sufficient incentive to encourage the minimisation, reuse, recycling and clean disposal options. However, it may also increase the level of illegal dumping. It was suggested that if on Sundays the rate payers could dump their wastes free of charge this would help decrease the amount of illegal dumping.[210]

2.117 The Committee was told that the best incentives for increased waste avoidance and recycling were financial but these could be effective only if alternative methods were prohibited by enforceable legislation and regulations.[211] The City of Wangaratta in Victoria has introduced a by-law prohibiting the dumping of recyclables.[212] The revenue from

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[207] Local Government Association of New South Wales and the Shires Association of New South Wales *A response to the Minister for the Environment's Green Paper on waste management, Executive Summary,* March 1993, p.ix.

[208] Rijswijk, Evidence, p.492.

[209] Hyman, Evidence, p.92.

[210] Lohning, Evidence, p.277.

[211] Ewald, Evidence, p.442.

[212] National Environmental Law Association Limited (1994) *Greenhouse Action & Local Government Issues for Today and Tomorrow,* Discussion paper - March 1994. Prepared by Enviro-Futures, p.14.

final disposal charges should be used to subsidise novel ways of reuse and recycling.[213]

Waste Water

2.118 The Committee did not deal with the issue of waste water in any detail during this inquiry as it has received a great deal of attention during recent years. The Committee did touch on this matter in its report on *Water Resources - Toxic Algae* tabled in December 1993. The Industry Commission also produced a substantial report, *Water Resources and Waste Water Disposal* in July 1992.[214]

Sewage

2.119 The treatment of sewage has also received a great deal of attention in recent times and therefore will not be dealt with in any detail in this report. Recent reports include the National Water Quality Management Strategy series of *Draft Guidelines for Sewerage Systems*;[215] the CSIRO Report on *Sewage Sludge Treatment and Disposal*;[216] and the Department of Primary Industries and Energy's *Review of Effluent Disposal Practices.*[217]

2.120 The Committee is aware that there are still problems to be addressed in this area. Mr Ian Kiernan expressed the view that the design of the Picton sewage treatment works to discharge into the river

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[213] Ewald, Evidence, p.442.

[214] Industry Commission (1992) *Water Resources and Waste Water Disposal*, Report No.26, 17 July 1992.

[215] National Water Quality Management Strategy, *Draft Guidelines for Sewerage Systems Effluent Management*, August 1992, Australian Water Resources Council; National Water Quality Management Strategy, *Draft Guidelines for Sewerage Systems Acceptance of Trade Wastes (Industrial Wastes)*, August 1992, Australian Water Resources Council.

[216] CSIRO Australia (1990) *Report on Sewage Sludge Treatment and Disposal - Environmental Problems and Research Needs from an Australian Perspective*, Division of Chemicals and Polymers.

[217] Department of Primary Industry and Energy (1991) *Review of Effluent Disposal Practices*, Australian Water Resources Council Water management Series No.20. AGPS, Canberra.

system in periods of maximum flow demonstrated a lack of commitment or a lack of vision.[218]

2.121 The Department of Primary Industries and Energy has held discussions with state and local governments to promote new technologies.[219] The Commonwealth Government has provided funds for the upgrading of the Perth sewerage system on the condition that innovative technologies and practices be used.[220]

2.122 Sewage sludge incineration is very widely practiced overseas.[221] Sludge is incinerated in Canberra to produce a calcium and phosphorus rich ash which is used as a farm fertiliser.[222] The demand from farmers for the ash exceeded supply.[223]

2.123 The incineration of sewage sludge has also been used to reduce the amount of sludge going to landfill by 500 000 m^3 and reduced the amount of methane which can be produced during the anaerobic digestion of sludge.[224] Waste oil and grease can be used as an incremental fuel and ACT Electricity and Water were constructing a facility which would utilise a broader range of waste fuels.[225]

2.124 The Committee was told that the NU-soil process could compost human sewage in as little as 6-8 weeks without troublesome odours and that pathogens were reduced to safe levels.[226]

2.125 The view was given that the disposal of sewage sludge to land was the best option as far as Australia was concerned. The nitrogen and

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[218] Kiernan, Evidence, p.265.

[219] McDonald, Evidence, p.184.

[220] Department of Environment, Sport and Territories, Supplementary Submission No.69, p.5.

[221] Barnett, Evidence, p.228.

[222] ACT Electricity and Water, Submission No.76, p.1.

[223] Ibid, p.1.

[224] ACT Electricity and Water, Submission No.76, p.1.

[225] Ibid, p.2.

[226] Stevenson, Evidence, pp.476,480.

phosphorus could be used as fertiliser, the carbon as a source of energy and water is the other valuable component.[227]

Concluding Comments

2.126 The *National Waste Minimisation and Recycling Strategy* and the 50 per cent by the year 2000 target have provided a great deal of momentum for improving waste minimisation procedures and policies in Australia. The Committee was told of a considerable amount of progress in cleaner production and waste reduction technologies and practices as well as the hurdles still to be overcome.

2.127 There is still debate as to who should have the responsibility for waste minimisation. There was a tendency for local governments and community groups to insist that the responsibility, particularly in relation to funding issues, should be entirely with industry in relation to the costs involved. The Committee believes that there is a lot more that industry can achieve and some of the more progressive industries have clearly demonstrated this.

2.128 There still remains the question as to whether industry should be required to take full responsibility. What share of the responsibility should the community have for the use of those commodities and what share should governments have as part of their community responsibilities? This issue needs further debate and clarification.

2.129 Recycling in particular has received a great deal of attention over recent years and considerable debate is now in progress on the perceived versus the real environmental benefits of recycling various materials as well as the economic considerations. By comparison, relatively little attention has been paid to the repair, servicing and maintenance of items. The Committee would like to see more attention paid to this aspect.

2.130 The recent downturn in the prices of some recycled materials, such as paper, plastics and glass, reduction in the price of virgin materials, cheap imported materials, the reduction or withdrawals of subsidies from industry and limited demand has resulted from an

[227] Priestley, Evidence, pp.708,711.

oversupply.[228] Coupled with the downward trend in prices for recycled goods is the increase in operational costs.[229] There now appears to be a formidable gap between the cost of collection and the market value of almost all recyclables except aluminium.

2.131 The recycling or reuse of organic waste is one area that requires further attention. The Committee was concerned with the lack of knowledge of some councils in relation to the available options and the lack of commitment by others to deal with this issue. The Committee would like to see more effort by the State and Commonwealth governments to provide this information to local government. The Committee also believes that any campaign to inform local government of the alternatives must include seminars, meetings or visits, as many councils were unaware of the available literature.

2.132 Some studies have shown that the motivation of the community to recycle is a 'personal obligation' to do the right thing but should the cost in terms of money or time become too burdensome for the individual, recycling may lose its appeal.[230] The Environment Management Industry Association of Australia pointed out that by recycling material from the household garbage the community considers that it has done its bit but at the end of the day, nothing is really achieved if that material is not reprocessed into something useful.[231]

2.133 The Victorian Recycling and Resource Recovery Council is surveying community attitudes to recycling waste disposal to determine what the community is prepared to pay for a recycling service rather than other interest groups defining what the community does.[232]

2.134 A great deal more needs to be done in developing markets for recycled and reprocessed materials. The major barriers to recycling

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[228] Department of Environment, Sport and Territories, Submission No.69, p.19-20.

[229] Ibid, p.20.

[230] *Waste Management & Environment Magazine*, November 1993, pp.58-60.

[231] Cole, Evidence, p.524.

[232] Brotherton, Evidence, p.699.

include the adequacy, reliability and quality of supply, uncertainty of markets and the price of materials.[233]

2.135 The Committee was told that German scientists estimated that a 10 per cent source reduction in waste can achieve the same energy benefits of incinerating 100 per cent of the waste.[234] The Waverley and Woollahra Councils were of the view, however, that:

> in recent times environmental groups bitterly opposed expensive waste treatment facilities, believing that with political will and adequate funding, all waste could be recovered for useful purposes. Experience has shown this is not possible and may not always be desirable, as greater environmental damage was sustained in some recovery processes.[235]

This provides a challenge to society to demonstrate that this is not the case.

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[233] Boerner C and Chilton K (1993) *Recycling's Demand Side: Lessons from Germany's "Green Dot"*. Center for the Study of American Business. Contemporary Issues Series 59, August 1993, p.16.

[234] Denlay, Evidence, p.504.

[235] Waverley and Woollahra Councils, Submission No.61, p.5.