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Household Waste Management

Recycling of household waste materials has a two-fold advantage: it reduces the volume of material going into landfill disposal sites and provides income to the council form the sale of the recyclable materials.

Household waste

The amount of rubbish generated by households has been estimated by analysing the contents of their rubbish bins. However, this method misses waste that has been incinerated, recycled at home or taken personally to a rubbish tip or recycling centre.

A survey in 1989 estimated that across Australia local councils collected an annual average of 370 kg of waste per person. A more recent survey in 1995 of 302 households in Mitcham, South Australia estimated that each year households in that area generated 355kg of waste per person, or about 906kg of waste per household.

3 ### Paper

There are various grades and types of paper, each with its own supply and demand and quality specifications.

High grade, white office paper

This has the most favourable market demand if separated from other types of waste.

Cardboard

This has established markets and reasonable market demand, although oversupply can be a problem. Cardboard generally needs to be collapsed and baled for commercial collection. A major source of cardboard is supermarkets who are generally provided with a baler.

Newsprint

Australian Newsprint Mills has established a 130,000T/year newspaper recycling facility at its Albury paper mill which has resulted in councils having access to a stable market at agreed prices. Marketing is undertaken by a subsidiary company, Kerbside Papers. The local cardboard box manufacturing industry is another long term purchaser of old newspapers.

Mixed paper

This can be recycled to produce recycled cardboard and lower quality grades of paper, but it has little commercial value.

Liquidpaperboard

Liquidpaperboard recycling is a relatively recent development, but already cartons are being collected in nearly half of the kerbside schemes across Australia. Drop off schemes also exist in Sydney, Melbourne, South Australia and Tasmania. Collected cartons are purchased by Australian Paper, who use the high quality fibre to produce recycled copy and office paper. This system has the capacity to use all cartons collected.

6 ### The History of Garbage in Australia

Until a few generations ago, garbage was not a major problem in Australia, mainly because people didn't produce much garbage and there were plenty of places to dispose of what was produced. In those days, people didn't throw out much garbage for a number of reasons.

There was little unnecessary packaging; bottles for milk, beer and soft drink were refilled; food scraps were either fed to the dogs and chooks or composted with garden waste; a lot of rubbish was burnt in

backyard incinerators; children's clothes were passed on to younger children; and broken shoes, toys, tools and utensils were repaired rather than thrown away.

Any garbage that could not be reused, refilled, recycled, burnt, given away or fixed was placed out in small metal bins (called dustbins), collected by "dustmen" and taken to Council landfill sites ("tips"). These "tips" were usually old quarries and , when filled, were often converted into recreational areas.

Garbage today

Since the 1970s garbage has become a problem, mainly because people have been throwing away more and more garbage. This increase has followed a change to our way of living. Supermarkets have largely replaced the small shops and home delivery, especially for food. This has led to an increase in packaging and the use of non-refillable containers.

There has also been a greater acceptance of disposable products (e.g. tissues), convenience foods and takeaway food and drinks with disposable packaging. With more efficient manufacturing practices, the cost of household appliances and tools has decreased, so that it is now cheaper to buy a new product than fix a broken one.

Fewer people keep chooks, and most pets are fed on packaged pet food rather than family scraps. With concerns over air pollution, many Councils have banned backyard incinerators. All these changes have led to a huge increase in the amount of garbage that each of us throws away.

To make matters worse, the population of Australia has steadily increased. This means that we now have more people, each one producing more garbage than in the past.

To further add to the problem, some Australian cities today are facing a shortage of suitable landfill. Sites in close proximity to major urban areas are becoming increasingly scarce and face opposition by local neighbourhood communities.

Why don't we just dig more holes or use old quarries to get rid of our garbage once our present landfill sites are filled? The answer is not that simple. People may object to a new landfill site being established where they live, because concerns about smell, litter, pollution and reduced value of their homes. This is known as the "not in my backyard" (NIMBY) phenomenon. In addition, waste management authorities have strict regulations concerning the formation and management of landfill sites to protect public health and the environment around the sites.

Therefore, it is often difficult and
7 expensive for Councils to establish new landfill sites. Often the only choice for Councils with no landfill sites is to take the garbage from their city or shire to a landfill site in another area. They may have to build a transfer station and truck the garbage long distances to the new site. This may increase the cost to a city or shire of disposing of their garbage.

In the Adelaide metropolitan area, there is not only the problem of a lack of suitable landfill sites but also meeting the cost of environmentally responsible facilities.

The industry Commission reports that incineration of household garbage is a fairly common practice overseas, but is only used to a limited extent in Australia. This is mainly because the cost of incineration of waste is generally much higher than disposal to landfill and because of community concerns about potential environmental damage.

Garbage in Australia

According to the Commonwealth Environmental Protection Agency, Australians generate almost 14 million tonnes of garbage a year. This is about 800kg per person per year. In 1989, the total cost to collect and dispose of all this garbage was about $500 million or about $28 per person a year.

In most capital cities, around 30-40% of all the garbage going to landfill is household and other Council garbage. The rest is made up of commercial and industrial waste and building and demolition waste

8 Recycling – Did You Know?

- A 1 litre milk carton can produce up to 5 sheets of office paper.
- Newspaper can now be recycled back into new newsprint. 160,000 tonnes of waste newsprint goes to produce new Australian newsprint with up to 40% recycled content.

9 Paper Recycling

Recycling doesn't just cut import bills. It can reduce water use by nearly 60 per cent and energy consumption by 40 per cent. Air pollution can be decreased by 74 per cent and water pollution by 35 per cent. (These figures depend on many factors, including transport distances taking paper waste to mills for re-processing and de-inking methods used).

Progress has enabled greater use of reclaimed paper, particularly with the increased ability to remove contaminants (e.g. staples, paper clips, glues and inks) De-inking techniques make it possible to use old newspapers on a considerable scale. Washing, cleaning and filtration removes the very short fibres that would weaken the new product…

Although technology can solve many challenges of recycling paper and board, the way in which they are designed can present new obstacles. To be recycled, it must be pulped, and if it is laminated with plastic, for example, then more extensive pulping is called for. Synthetic glues often used in binding books and magazines can produce sticky residue in the paper making plant…

Of course it will never be possible or desirable to recycle everything. Many products become soiled in use and could present a health hazard if reclaimed. Recycled paper and board should be kept clean and separate form other waste materials. Paper which cannot be recycled or made into alternative products still represents substitute fuel, for which there is great potential.

10 While no clear consensus exists whether recycling is preferable to energy recovery, most life cycle studies have found that both options are better than landfill disposal. Recycling does face problems. Balancing supply and demand is difficult, and a decline in demand for new paper and board – the inevitable result of lower economic activity – can frustrate collectors such as charities, local community groups and schools.

World-wide, separate collection of recyclables is increasingly popular. Such collection is unfortunately not always in step with consumption, putting surpluses of recyclable material on the world market at very low prices.

It is clear that paper recycling can only work well if collection and consumption are co-ordinated. Industrialised nations boast of the 'paperless office', yet we annually consume more and more. Elsewhere, more than one billion people are illiterate, unable to progress without access to paper.

18 Waste not

19 Much of the recycling debate has concentrated on the disposal of domestic waste, yet this makes up only one third of the waste to landfill. The other two-thirds are, in about equal proportions, commercial/ industrial and building waste.

There have been improvements in these areas, with industries involved in road building and plastering

now starting to recycle. But little progress has been made in problem areas such as carpets, computers and white and brown goods.

22 **The benefits of minimising waste**

- It conserves valuable resources including: Minerals – used to make many useful materials (e.g., bauxite is used to make aluminium). Energy – use in mining, harvesting, manufacturing and transporting. Native forests – used to make some types of paper and other wood products. Petroleum – used to make plastics. Landfill sites – the life of existing sites is extended.
- It saves money. Reducing waste can save money in many different ways. If you waste less, you get more out of what you buy and waste disposal costs are reduced. Businesses become more efficient through cleaner production, less wastage and using fewer raw materials. Household incomes stretch further. Reduced collection and disposal costs benefit the whole community. Indirect costs are minimised, e.g., pollution clean-up.
- It reduces environmental impact. For example. Fewer areas need to be affected by resource extraction (e.g. mining), harvesting or solid waste disposal. Less fossil fuel needs to be burnt for energy, thus reducing the release of greenhouse gases and other pollutants. Less pollution by reducing the risk of soil and water contamination with nutrients and chemicals near landfills.
- Social benefits include: Increased community awareness of waste and environmental issues. Community co-operation and involvement, e.g. in Council recycling schemes. Increased enjoyment of the natural environment for present an future generations. Creating local employment through resource recovery schemes and other industry initiatives.

AVOID!

The most effective way to minimise waste is to avoid it in the first place. The responsibility is both that of consumers and producers of products. Producers can ask whether a particular waste-generating substituted with a more substainable material or can the process be eliminated altogether? Consumers can avoid waste in many ways, e.g. by buying in bulk to avoid extra packaging or refusing carry bags when shopping, particularly if only a small item has been purchased.

25 What happens to the waste?

Ian Coles agrees but says more could be done. "If anything, landfill prices are too cheap to really underpin recycling programs," he says.

How will councils work to further reduce waste to landfill? Aylward says smaller domestic waste bins (120 or 80 litre), separate green waste collections, improving the separation of waste at transfer stations and encouraging people to separate newspapers and magazines form cardboard. (Bundling it all in together reduces its re-use potential.)

Late last year, the Bayside Council introduced a separate green wast collection (stick your green waste in your 240 litre bins - use the smaller one for household waste) which has apparently, been an enormous success.

The chairman of the Municipal Association of Victoria's recycling crisis taskforce, Bob Beynon, says separating green waste - lawn/garden clippings - from other domestic waste and reducing industrial waste is vital to reducing landfill waste.

Beynon says the 17 regional waste authorities and several privately owned landfill companies need to target green waste, which accounts for 30-40 per cent of domestic rubbish.

Some council transfer stations divert some green waste to be recycled into garden mulch and potting mix, but Beynon says a commercially viable market is yet to develop for these products.

The lack of markets for waste that has been so diligently separated for recycling is one fo the big impediments to reducing landfill waste.

Aylward says the lack of market development of end uses for recycled products is the biggest fault in the system and more responsible initiatives must come from industry.

Beynon says the stockpiling of paper by Visy and Amcor illustrates there is no planned use for some materials once they are collected.

"Stockpiles will only get bigger because the vast majority of paper is exported to Asia," warns Beynon. "For the time-being that market has dried up and our domestic market simply can't deal with what we recycle."

Also, 60 per cent of the 3.5 million tonnes dumped in Melbourne's landfills each year comes from industry, which Beynon says needs to clean up its act. Concrete, ashphalt and timber can be recycled.

Aylward says industry needs to closely monitor its waste production and recycling potential.

"More responsible companies should be looking at this on behalf of their share holders," he says, "Dumping adds to their bottom line, and they are all interested in reducing that."

26 Benefits of minimising waste

Less pollution

By reducing waste to landfill especially organic waste, such as food and green waste, the risk of contaminating the surrounding soil and nearby water resources with nutrients and chemicals is reduced.

The amount of landfill gas produced is reduced also and this improves air quality. Conserving resources should result in industry consuming less virgin materials which should translate into less mining and refining of materials and consequently reduced pollution.

Economic

Long term costs

The long term cost of past development activity is becoming apparent to the community in the form of polluted air, water and soil.

Land that has previously been filled with wastes has the potential to become and expensive liability for an owner if it is demonstrated that the site is impacting adversely on the surrounding environment. Apart from clean up costs, there may be ongoing monitoring and maintenance costs. There may be incurred until stable conditions are achieved with the landfill. This may take as long as 200 years after closure of the landfill.

Employment and Industry

It is now widely recognised that waste minimisation schemes create employment and provide opportunities for value adding to recovered materials through reprocessing and manufacturing. Although this may be an indirect benefit to councils, the economic well-being of the region is enhanced.

Reduced collection and disposal costs

An effective waste minimisation program could reduce the amount of waste being collected for disposal by 50 to 60 per cent. Savings gained from reduced collection and disposal costs could then be used to offset the cost of waste minimisation programs.

Another important consideration is that many councils are facing rapidly increasing disposal costs due to landfill operators having to take into account all the costs associated with landfilling waste. In the past, these costs were restricted to mainly direct costs such as land acquisition, plant and labour.

A better understanding of the environmental risks associated with landfilling now exists, as well as general community opposition to the loss of amenity landfills are expected to comply with much higher operating standards, including restrictions on the types of waste that can be landfilled.

New landfills tend to be further away from urban areas and consequently higher transportation costs are incurred. The end result of these changes is much higher establishment and operating costs. This trend of rising costs is expected to continue for the foreseeable future.

It is an ironic fact that artificially low disposal costs, brought about by
27 poor disposal practices, not only pass the burden of care on to future generations, but undermine the viability of existing waste minimisation programs.

Disposal costs that do not include all costs associated with operating the landfill, that is, staff resources, monitoring costs and closure/ rehabilitation costs, are artificially low.

Conservation of Resources

Present costs from many resources are recognised as being much less than their replacement cost and this is one of the main reasons for promoting ecologically sustainable development.

While low disposal charges discourage waste minimisation, low prices for other resources discourage resource conservation. However, there are many ways to minimise waste or recover materials form the wastes that are produced. Hence the need for full investigation and to carefully target areas.

Indirect benefits

There are many direct benefits associated with waste minimisation, however the nature and extent of these benefits will depend on local conditions. Some of them include:

- more efficient use of land (when used for non-landfilling activities);
- increased land values due to the absence of landfills; and
- increased environmental awareness that results in less pollution of natural resources and hence the avoidance of clean up costs.

Howeve, the ultimate economic benefit may well result from adopting a lifestyle that respects the needs of present and future generations.

Social

Increased community awareness

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Waste minimisation will require the co-operation of the community if it is to succeed and hence it will require continued contact between council and community. Waste minimisation is an ideal vehicle to reinforce existing community development programs.

Community co-operation

Market research consistently shows that concern for the environment rates highly with individuals. Waste minimisation programs are seen by many as an opportunity to do something for the environment. Waste minimisation therefore has the ability to create goodwill within the community.

Increased enjoyment of the natural environment

People's awareness of the natural environment may be raised by involving them in a program they perceive as helping the environment. This may result in less littering and roadside dumping of waste.

Waste minimisation also results in reducing the impact of waste disposal on the natural environment, thereby increasing its value to the community.

Public Health

There is potential for landfills to create public health risks due to the nature of activities carried out within them. Typically these risks are associated with vermin, flies, dust, odours, landfill gas, water contamination and litter. By having fewer landfills, these should be a corresponding reduction of these risks.

Creating employment

Materials recovery and treatment may be labour intensive so the introduction of a waste minimisation program has the potential to create employment at the local level.

When industry groups are being expected to develop waste minimisation programs to comply with Sate legislation, there should be opportunities for councils and industries to form partnerships to achieve their respective waste minimisation goals.

Conclusions

It can be seen from the information presented in this Section that there are many potential benefits to be gained from minimising waste. However, unless all costs associated with existing disposal practices are identified (and many of these costs remain hidden because there is no awareness of them) these benefits may not be realised.

29 Major types of rubbish

Clean up Australia's dedicated army of volunteers collected in 1997 a wide array of garbage. All of the rubbish could have been properly disposed of and much of it can also be recycled.
The main type of rubbish collected by Clean Up's dedicated army of volunteers in 1997 was plastic!

Plastic, in the form of shopping bags, chip and confectionary bags, cups and straws, made up a staggering 35% of the total rubbish surveyed.

Paper and metal /aluminium (each comprising 18% of the total) were the next most common types of rubbish collected, followed by glass (15%), miscellaneous items (11%), wood items (2%) and rubber (1%).

Plastic (including polystyrene) has been the most common type of rubbish collected on Clean Up Australia Day for the past 4 years!

One of the interesting trend this year was the fact that there was an increase in the amount of glass and metal/aluminium collected compared to the previous year (up 4%).

How long does it take to break down?

- Orange and banana peel up to 2 years
- Cigarette butts 1-5 years
- Wool socks 1- 5 years
- Plastic coated paper 5 years
- Plastic bags 10 – 20 years
- Plastic film containers 20 – 30 years
- Nylon fabric 30- 40 years
- Leather up to 50 years
- Tin cans 50 years
- Aluminium cans and tabs 80 – 100 years
- Glass bottles – 1 million years
- Plastic bottles indefinately

30 Waste Reduction

Impact of Waste Reduction

Environmental impacts of waste reduction initiatives may include resource conservation and reduced pollution.

Economic impacts of waste reduction initiatives may include:

- Costs of modifying production
- savings through reduced material requirements
- savings in transport costs
- savings in landfill costs

Social impacts of waste reduction initiatives may include changes in purchasing and consumption patterns.

Volume restrictions

There is a significant amount of evidence that indicates the amount of waste generated by a household depends on the size of the bin available. Research by Recycle NSW in 1993 revealed that larger garbage bins resulted in more waste being diverted into the bin. An effective way to reduce the amount of waste generated may be to limit the volume available.
Another approach it to reduce the frequency of services. This will result in labour and transport costs savings as well as savings due to avoided landfill costs. The options available need to be balanced against:

- community expectation
- incidence of illegal dumping
- problems caused by stomping on bin contents

Differential pricing

Limiting all households to the same quantity of waste is considered to be inequitable in some circumstances, due to differences in factors such as the size of the family.

A more equitable approach, although administratively more difficult, is to adopt a differential pricing structure for waste removal. Households can determine the level of service that is most appropriate to their specific situation.

Charging users of waste services on the basis of the quantity of rubbish they generate can be a powerful incentive to minimise waste and, if structured appropriately, there is an opportunity for residents to save money by minimising waste. The differential pricing schemes that may be implemented include:

Pay by volume

Pay by volume systems involve charging households according to the volume of waste they set out. Residents are given the choice form a range of bin sizes and are charged according to the size of bin they select. These systems are relatively easy to administer and promote.

Bag or tag systems

Bag or tag systems are similar to volume based systems, but the charge levied relates to actual volume available. This rewards households that do not use the service as frequently as it is provided.

Local governments may provide all households with a certain number of bags or tags per year, which are charged for through rates. Any additional bags or tags required can be purchased from local government or local stores.

Pay by weight

Pay be Weight systems involve charging households on the basis
31 of the weight of waste collected. They offer householders a constant incentive to minimise waste, rather than use the available volume of their rubbish bins.

These systems depend on relatively sophisticated technology, including the installation of weighing and computer equipment which identifies the bin and measures and records its weight. This system requires modifications to vehicles and the provision of special bins.

Rebate systems

Under the rebate system, householders pay for a standard service level and then receive a rebate (reward) for using the service less often.

Waste bans

Restrictions on the placement of specific materials, such as garden waste, in household rubbish bins can be introduced. The non compliance with the restrictions can be discouraged through:

- reminder notices of the restrictions being attached to bins containing this material (the 'soft' approach)
- the non-collection of offending bins (a more confrontational approach)
- the imposition of fines to offenders (the 'hard' approach)

Bans should only be considered where alternatives for disposal of the restricted material exist. It is often difficult to easily detect organic material within domestic waste, except for bulky and obvious materials such as tree prunings or loose lawn cuttings.

However, given the proportion of organic waste in the domestic waste stream, with a corresponding contribution to landfill, restrictions on the placement of some types of compostable organics is worth consideration.

The soft approach, using reminders for non-compliance, is recommended in the early stages of introduction. Fines should only be applied if necessary, as they may lead to community opposition to the introduction of waste minimisation initiatives.

Potential initiatives

Local governments can encourage residents to reduce the amount of waste generated through restrictions on the amount of waste that is collected. This can be done by implementing one of the following systems:

- limiting the maximum allowable volume per collection
- reducing the frequency of services provided
- introducing a differential pricing scheme
- restricting the disposal of certain types of material

Fremantle City Coucil - Case Study

In September 1993 Fremantle City Council embarked on a nine month waste minimisation trial involving 1,906 households. the trial set a target of 50% reduction in waste to landfill and this was achieved by gaining support for the trial from 85% of the participating households. An important element of the trial's success was the formation of a waste minimisation committee which met on a fortnightly basis to manage the trial.

From the results of attitudinal surveys, the committee identified behaviour patterns as being the main impediment to achieving the 50% target. The following measures were adopted to bring about the desired change:

- providing residents with information kits
- implementing a comprehensive promotion and encouragement program (waste hotline, public meetings, information in the print media, appointment of precinct managers)
- encouraging residents to provide feedback (community noticeboards)
- recognition of the residents' role in making the trial success (and the environmental benefits associated with a successful outcome.

The critical elements of the trial were:

- encouraging the active participation of residents in the decision making process through the precinct managers.
- introducing a fortnightly collection service (all households had a 240L mobile garbage bin)
- introducing a fortnightly kerbside recycling service
- introducing a monthly kerbside green organics collection service
- providing residents with sufficient information about the trial, including a personalised practical advice service
- providing residents with regular and frequent feedback about the trial's progress.

As a result of the trial, the City of Fremantle has introduced a fortnightly collection for all households and this has resulted in about a 50% reduction in waste to landfill based on 1992 waste generation rates.

32 Waste reduction accreditation program

Every year Australians produce 18 million tonnes of waste, which is equivalent to one tonne for every man, woman and child.

Not only does this figure represent an appalling waste of natural resources, but we are fast running out of landfill areas to dump it.

And the cost to our environment is immeasurable. Waste can be toxic, contaminating ground, water and air. Decomposing waste can also release methane gas into the air - a greenhouse gas 21 times more potent than carbon dioxide.

When rubbish is not disposed of correctly it can end up in the environment - where it can kill or maim wildlife, or have to be collected by our army of dedicated Clean Up volunteers on Clean Up Australia Day.

…

"Packaging also accounts for one third of all waste Australians generate, therefore retailers are in a good position to correct this situation by encouraging suppliers and customers to change their habits and produce/ choose products with minimum or recyclable packaging

40 Glossary

Composting

Composting the natural breakdown of kitchen scraps and garden wastes to a dark, loose "earth-like" substance which will supplement your soil and reduce erosion and water loss. This substance can be used to enrich your garden, pot plants and lawn.

Energy recovery

Energy recovery refers to the use of waste products as a source of fuel through the incineration of waste and the recovery of heat energy form the process. The energy that is recovered can be used directly as heating or for the generation of electricity. Energy recovery becomes an option when reduction, re-use, or recycling have been fully explored and are able to be achieved. Energy recovery from the domestic waste stream is not widespread in Australia, compared to most other industrialised countries.

Landfill

Landfill is the main form of waste disposal. This is due to the relatively low cost of landfills, and availability of land in many areas. In some cities the establishment of new landfills is becoming a major problem for municipal authorities due to incrasing scarcity of open land and growing community opposition. Landfills are a major source of pollution - solid waste decomposes to produce acidic leachate and methane which can contaminate the air, land, surface and ground water systems. Also, noxious odours can occur which permeate the surrounding air.