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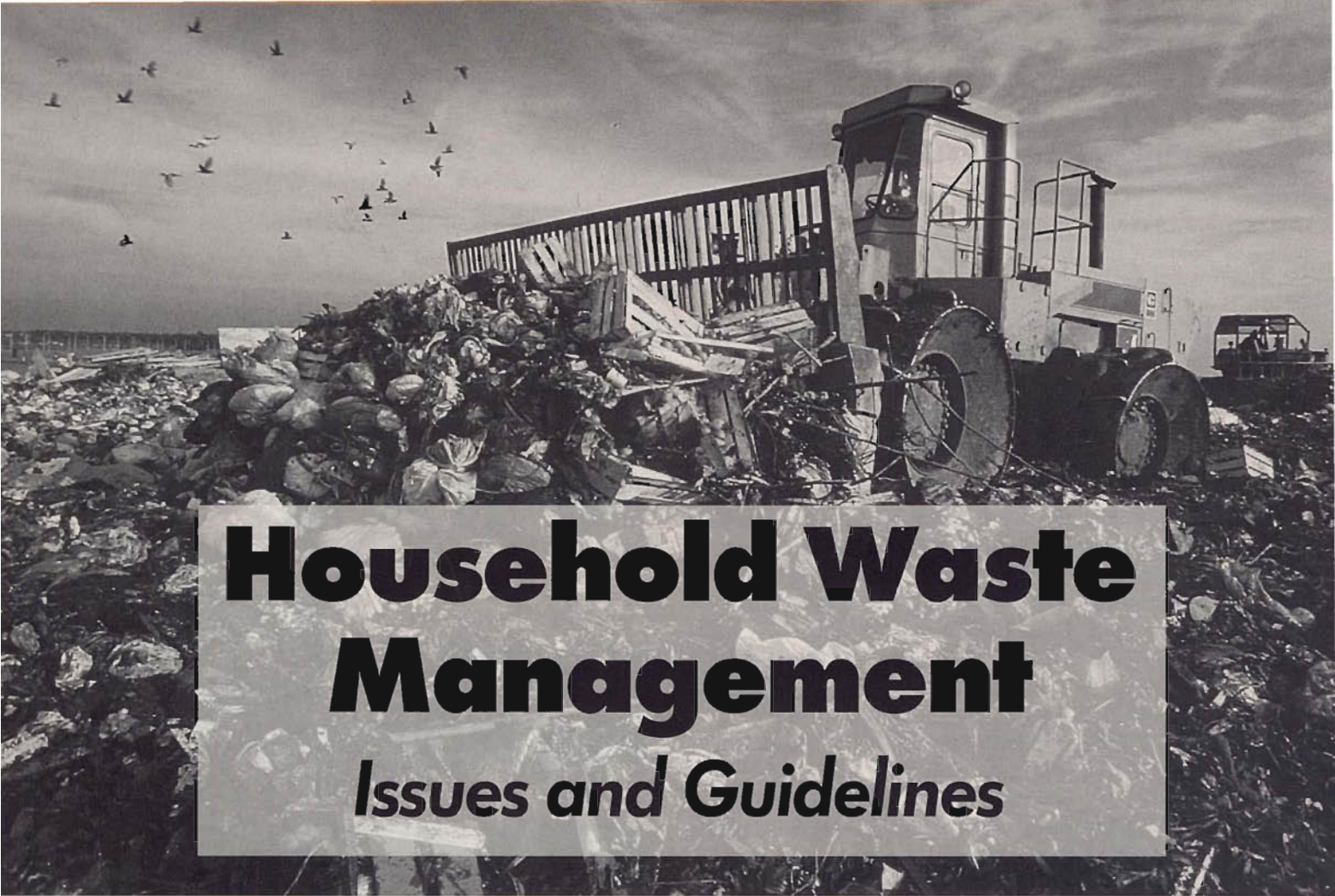
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# Household Waste Management

## *Issues and Guidelines*

by  
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**W**orldwide, the very mention of household waste brings to mind images of refuse trucks and overflowing landfills that pose environmental concerns like groundwater pollution and unpleasant odors. The decreasing availability of land for landfill—in the United States more landfills close than open each year—and the NIMBY (Not-In-My-Back-Yard) syndrome have drawn attention to how society should manage household waste. In addition, broader societal concerns for the sustainable use of the environment have forced an examination of how society uses the earth's natural systems as a sink for human waste.

The highly visible nature of household waste makes it an easy environmental target, and the plethora of facts and figures further draw attention to the size of the waste stream. The amount of household waste generated continues to increase and in industrialized countries has reached very high levels, as shown in figure 1.

To place these figures in context, in the United States, total household waste increased by more than 60 percent between 1960 and 1993, from 450 to 730 kg/capita per annum, while the population increased by 38 percent (Choe and Fraser).

Society has developed and implemented an ever-

increasing set of policies and instruments to attack problems of household waste. Here we consider several policies used worldwide to deal with these problems. We draw attention to the interdependence of available policy options and the incentives they create to reduce (or sometimes worsen) the problem of household waste.

### **Government reactions to household waste and results**

Governments have unsystematically attacked waste at various stages of the waste production and disposal chain. Take Australia as an example. In 1992, the Commonwealth Government introduced the National Waste Minimisation and Recycling Strategy (NWMRS). The NWMRS aimed to improve recycling collection and reuse, seeking a 50 percent reduction (from 1990 levels) in waste going to landfill by the year 2000.

Each state in Australia's federal system of government responded to the NWMRS in its own way. Within each state, local councils put policy into practice. The result has been an array of economic incentive mechanisms used to induce efficient household waste management. This uncoordinated reaction is well illustrated by the differ-

ences in curbside garbage collection schemes. Some councils employ a fixed charge, others charge by bin size, and still others offer subsidies based on the number of times a household does not put a bin out for collection (Choe and Fraser).

Other countries have also made ad hoc policy responses. In the United States, no legislation governs household waste management. Some forty states have introduced solid waste reduction or recycling goals that range between 15 and 70 percent by the year 2000. Of these, thirty-five states have legislated recycling goals. In addition, U.S. counties and towns use a variety of curbside charges, sometimes based on weight and sometimes based on volume (Fullerton and Kinnaman).

An alternative approach to household waste management is to minimize the intrinsic waste content of products. This option extends producer responsibility and transfers the cost of waste management to industry. The 1991 German Packing Ordinance, for example, requires producers to collect, sort, and recycle packaging. Industry created the *Duales System Deutsch* (the Green Dot Scheme) to implement the program. Australia's National Packaging Covenant provides a similar approach to cutting household waste. In the United States, Florida introduced the Advanced Disposal Fee (ADF) on packaging that did not meet recycling rate standards. The ADF aimed to increase recycling and reuse of recovered materials. By the end of 1995 the ADF lapsed, however, as most materials satisfied recycling objectives and administrative cost exceeded the revenue generated.

Other approaches to waste management include industry-set standards on waste content to stimulate the demand for recycled materials, ecolabelling, and deposit-refund schemes.

At least in part because of government policies, households now recycle more waste (figure 2). The extent of recycling means that households now direct a substantial amount of waste away from landfills. In 1995, Victoria (Australia) recycled 36 percent of potential solid waste landfill. Only four U.S. states (Washington, 38 percent; Florida, 40 percent; New Jersey, 42 percent; Minnesota, 44 percent) performed better. Although figure 2 only includes data for paper and glass, households also recycle plastic and other materials. Plastics are the fastest-growing component of municipal solid waste. In the United States, plastic waste grew by 48 times, from 0.36 to 17.5 million tons per annum, between 1960 and 1993. Plastic's physical toughness, versatility, and low cost of production caused this explosion. Unfortunately, "tough" plastic cannot be easily biodegraded.

Although government recycling targets may have helped boost recycling efforts, targets can also cause

mischievous. Take paper as an example. The Asian economic crisis has significantly reduced the demand for recycled paper from Australia. It is now virtually worthless and rapidly accumulating. Despite this disequilibrium, governments maintain existing recycling targets and the collection of paper from households continues. Many councils, who collect and sell recycled paper, have no way to use their large stockpiles. In order to resolve this problem, governments have given subsidies to local councils to dispose of the stockpiles by incineration (energy recovery) or landfill burial. In situations like this, can recycling be justified? Economic principles, in contrast to adherence to arbitrary recycling targets, can help provide better solutions.

Indeed, many experts challenge the present emphasis on household recycling. The U.S. Environ-

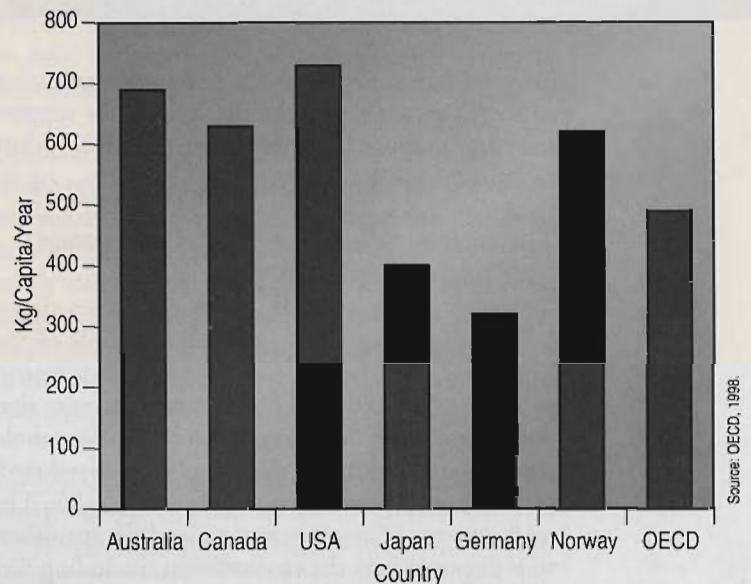


Figure 1. Municipal waste generation (mid 1990s)

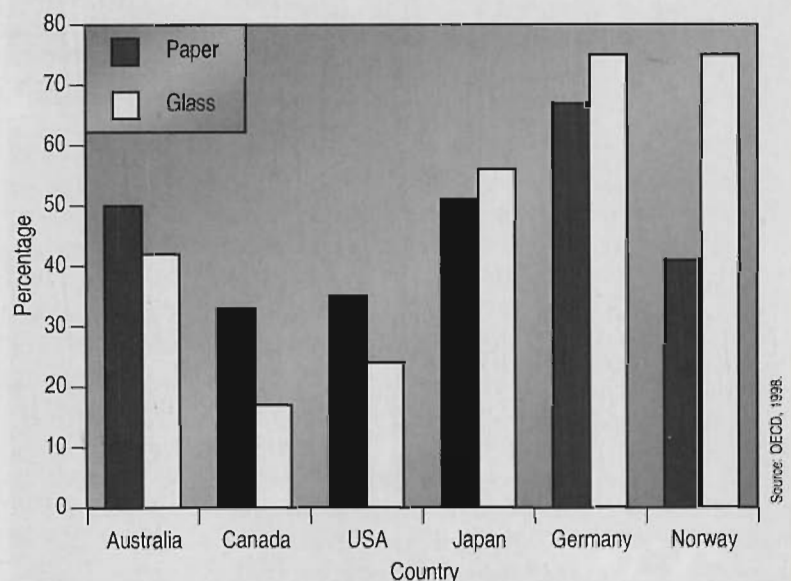


Figure 2. Waste recycling rates from household waste in 1995



mental Protection Agency prefers source reduction to recycling. Others argue that businesses support recycling because it encourages consumers to buy new products on a more regular basis.

### **The waste chain, economic players, and policy instruments**

The choice of a sensible household waste policy needs to be preceded by a careful analysis of the issues at hand, the list of available policy instruments, and the ways these instruments can alter the behavior of the players involved. Household waste is generated, and therefore may be reduced, partly by producers and partly by households. The total amount of waste going to landfills (or otherwise disposed into the environment, including illegal dumping) depends on the entire chain of decisions made by producers and households. Sensible policies need to be based on clear awareness of this entire chain. For some wastes, producers can play an important role in source reduction, and for others, households can reduce disposed waste by further processing the waste to a useable product or recycling the waste.

Take for example beverage containers like aluminum cans or plastic bottles made of PVC or PET. In most cases, households cannot further process the containers, but must recycle (if available), throw into garbage bins, or dump elsewhere. For this type of waste, policies need to focus on source reduction and proper disposal rather than on household processing. Primary food products lie at the other end of the waste spectrum. Here, composting can be quite effective. Many apartment complexes in Japan and South Korea compost 100 percent of their food waste, which is then sold to neighboring farms as fertilizers. In Australia, about 50 percent

of the materials in the average domestic garbage bin could be composted. Primary food producers, on the other hand, have few ways to minimize waste. In this case policies need to focus on household waste processing and proper disposal.

What policies might encourage source reduction, household processing, or recycling? Governments have promoted source reduction through green taxes on packaging, content standards to encourage the use of recycled materials, and bans on particular products. The Montreal Protocol (1987), for example, will completely eliminate CFC-based appliances by the year 2000 in developed countries. Carrot-type economic incentives for household recycling and waste processing include recycling subsidies and subsidies to purchase compost bins. Stick-type incentives include waste collection charges and fines for littering. Some policy instruments can simultaneously target source reduction, waste diversion, and proper disposal. Deposit-refund schemes and the German Green Dot System simultaneously target source reduction, household waste processing, recycling, and proper disposal.

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### **Economics of waste management policies**

Waste management policy must recognize that various players interact in the waste chain. A single policy instrument to target a single waste type or waste generator will frequently fail. Consider plastic bottles. Because PET bottles cause relatively little environmental harm, policy makers might be inclined to place a green tax on PVC bottles. However, without further policy to motivate proper disposal, households might illegally dump PET bottles, thus causing greater damage than proper disposal of PVC bottles. A green tax on PVC bottles needs to be accompanied by incentives for proper bottle disposal. As experience has shown, the deposit-refund system does exactly that. Simply put, a coher-

ent whole waste policy needs to consider interdependent policy instruments, rather than a number of stand-alone instruments.

### Pricing at the margin

Both producers and households respond to incentives to alter the last unit of waste disposed, rather than to the total amount paid (or charged) by government. Imagine, for example, what households will do if they must pay a fixed charge for garbage collection regardless of the amount of waste. Communities in many countries use exactly this type of fixed charge. Households have no incentive to reduce the amount of waste. On the other hand, if government charged for each additional unit of garbage, say, a per-bag collection charge, households have an incentive to reduce solid waste going to landfill. Similarly, producers will respond to government penalty and subsidy incentives which change the costs or benefits of producing one more unit of waste.

Consider waste that can be significantly reduced by producers but not households—plastic packaging and containers, for example. Policy in this case should focus on source reduction and proper disposal. A combination of a green tax on producers and a low garbage collection charge on households promotes waste reduction and proper disposal. While it is true that a high garbage collection charge can lead consumers to demand products with less waste, it can also make households consider illegal garbage disposal.

Waste from food products, in contrast, offers significant opportunities for further household processing. Proper price incentives can work effectively to motivate composting of household waste. Many countries and cities have introduced various forms of price incentives: some U.S. and European cities charge on a per-bag basis for waste removal; South Korea charges for a special bag which households must use for waste collection; New South Wales, Australia, pays a subsidy to households each time they don't put garbage bins out for waste collection.

Various studies have shown, however, that price incentives are a double-edged sword: price incentives encourage further household processing, but they can also lead to illegal waste disposal. Price incentives need to be accompanied by other policy instruments, for example, monitoring and fines to control illegal dumping. Price incentives targeted at producers of this type of waste aren't likely to be effective. Technology offers few production alternatives and the producer can only reduce waste by selling less product.

For wastes which offer limited opportunity for further household processing or recycling, but for which illegal disposal causes high environmental

damage, it may be necessary to subsidize legal waste disposal. Such a subsidy can be financed through a green tax on producers who will shift part of the tax to consumers through the product price. Subsidized disposal of acid batteries and household chemicals provide examples.

Finally, waste that offers both source reduction and further household processing opportunities can be subject to government-induced price incentives. Producers will have incentives to undertake source reduction, and consumers will have incentives to process and recycle waste. However, other measures to control illegal waste disposal may also be necessary. Although price incentives to households can feed back to producers, they may also cause illegal waste disposal.

### Other issues

The discussion of the previous section relied mostly on price incentives, and, accordingly, ignores many important issues of practical policy implementation.

#### *Coordination problem*

Waste policy, as argued above, needs to be a coherent whole of various policy instruments. In practice, different government bodies control different policy instruments: national laws and rules put green taxes on producers, while local governments influence households. Harmonious implementation of policy requires close coordination and communication among different bodies of policy makers.

#### *Costs of implementation*

Costs, on top of those mentioned above, occur at every stage of implementing waste policy. Collect-



ing information for good policy costs money. The administration of waste agencies costs money. These costs need to be estimated and factored into waste policy decisions.

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#### **Nonprice policy instruments**

For a number of reasons, nonprice policy instruments, such as target setting, commands, public campaign, education, monitoring of illegal dumping, and so on, may be needed for effective waste management. In some cases, price incentives cannot be implemented. Price incentives are most effective when based on good estimates of their effects; however, information is not always available or is available only at prohibitive costs. Or, the costs of administering price incentives could be excessive. Finally, political considerations may also hinder the introduction of a new tax, although this argument cannot be justified on economic grounds.

#### **Looking to the future**

Waste management policies have spread markedly in recent years. Although there is less of a tendency to set arbitrary targets and employ simplistic policy initiatives, more attention needs to be focused on

interdependent policy instruments.

The realization that much of the household waste stream cannot be reduced further by household processing or recycling has led to a greater emphasis on source reduction. Ultimately, however, if a society wishes to greatly reduce household waste, it must either change its present consumption patterns or hope that technological advances nullify the problem. ■

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#### **■ For more information**

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