

Household refuse, the focus of most recycling schemes represent a small part of the total solid waste stream for most countries. The actual composition and size of the different components will vary between countries, reflecting different socio-economic and industrial conditions. Again, data are poor, limiting accurate comparison and analysis, but general trends are apparent. Household refuse in Western Europe consists only eight to nine percent of the total solid waste stream, and only four to five percent of the stream if agricultural wastes are included (table 4). No reliable data exist for New Zealand⁶. They are likely to be somewhat different from European flows, reflecting a greater reliance on hydro-electricity (and hence lower ash and mining wastes) for energy and less industry, so that domestic solid wastes make up a higher proportion of waste. However, the relativity may prevail if agricultural wastes are included. Tong (1988) suggested the composition varied throughout New Zealand depending upon the level of industrialisation, and urbanisation of individual towns and cities. He suggested the domestic waste stream contributed a third of Auckland's solid waste and up to half Christchurch's waste stream.

The recyclable proportion forms only a small part of MSW. Again reliable and comprehensive data are lacking, but trends are apparent (table 5). New South Wales analysis found potentially 27% of domestic waste could be recycled considering existing markets, putrescibles alone make up over half the waste stream (Prince,

⁶Data have been published using inputs from Department of Health funded regional waste surveys undertaken during the 1980s (Royds Garden Ltd, 1991). The original data are very suspect and the aggregated data do not appear sensible (see discussion in CAE, 1993, p50).

1993). Packaging typically makes up 30% of household waste.

Component	National (Tong, 1988)	Christchurch (1992)	New South Wales (1993)
Metals	4.8	5.1	2
Plastic	7.6	7.3	3.3
Glass	10	2.3	7.4
Paper	20+17.6	22.2	16.1
Food/green	40	46.2	51.2
Other	n/a	16.9	7.3

Table 5: Composition of the Domestic Waste Stream (Data: various)

Significantly, the German ordinance has only addressed packaging, given that some 2.5 billion tonnes of graphic paper, including newspapers, magazines and administrative papers, are disposed of each year, compared to the 7 million tonnes of packaging addressed by the packaging ordinance (Schnurer, 1993). This is despite regulatory requirements for recycling 50% of paper now.

Successful recycling also depends upon strong public participation. It is important, for householders are essentially reducing the labour costs of sorting the waste, by doing it free. High profile support exists for recycling (see chapter I) but fewer people are prepared regularly to sort their waste at source. Prince (1993), assessing the "highly successful" Sydney kerbside recycling scheme found that 58 - 65% of households actively participate in recycling schemes. However research showed that 3.5% of households sort all the potentially recyclable material, and half sort four-fifths or more of their available material. This is despite extensive publicity. Anecdotal evidence suggests similar levels appear to occur in New Zealand. The

consequence, as Prince (1993) in Australia and Alter (1993) in the USA note is that municipal recycling schemes are unable to meet rate-and-date targets for waste reduction.

4. *Macroeconomic Considerations*

The markets for recyclables are affected by prevailing macroeconomic conditions which determine demand for goods and raw materials. In this context, New Zealand government intervention is unlikely to be sufficient to counter macro-economic trends and action. Recyclables are in direct competition with virgin resources. Importantly, the cost structures of the competing resources differ, so that the ability of one resource to match changes in the other may differ. Recycling and secondary goods markets are often weak and volatile. They can be adversely affected by gluts driven by government recycling directives of large countries, such as Germany and the United States, see below for a discussion, against which small countries such as New Zealand are unable to influence.

The substitutability of recyclables for virgin resources means secondary markets also can be affected when large players dump on the virgin resources market. A current example is the slump in aluminium prices because of the Commonwealth of Independent States dumping its aluminium to earn hard currency. A consequence is that the recycled aluminium market has dropped from about \$1.00/kg in 1990 to about \$0.60/kg, jeopardising the established cash-for-cans recycling system established by Comalco in New Zealand.

5. *Technical and Implementational Incompatibility*

Recycling as a waste management goal also raises problems of technical incompatibility and conflicting policy goals. These problems may differ between and within countries, depending on the individual waste disposal practices.

European countries take differing stances with incineration for energy recovery. The French, with their wider view of valorisation, or extracting further value from waste, accept energy recovery as an acceptable form of recycling. The German approach is different, though Minister Töpfer is facing strong lobby to change. This is important for several reasons. First, Western European countries except Great Britain currently incinerate significant proportions of their waste and extract energy. France, for example, disposes of some 40% of its waste this way. The composition of the waste stream dictates the success of incineration. Plastics although only a small component of the waste stream, contribute significantly to the heating value of municipal solid waste with a heating value of three times that of typical municipal waste (Alter, 1993)⁷. Alter (1986) noted instances where waste plastics from industrial sources were added to MSW destined for waste-to-energy to assist combustion. Recycling regimes seeking to reduce the plastic component of waste would if effective therefore impact adversely on established incineration and waste-to-energy regimes.

⁷Paper makes up about 40% of MSW; plastics packaging about 5.5%. If the paper has a calorific value of 14 MJkg⁻¹, and the plastic about 46 MJkg⁻¹, plastics contribute 31% of the heating value of this mixture of these two materials (Alter, 1993: 326).

Landfill design and operation could be compromised if organic matter is removed for composting. Current landfill design assumes the landfill acts as a bio-reactor. The organic matter acts as buffers for mobile hazardous domestic and industrial wastes. Also, the decomposing organic matter provides the landfill gas. Any reduction in organic content would reduce the viability of any landfill gas energy recovery system and may result in more hazardous leachate requiring special treatment.

C. Efficiency Matters

Government intervention in recycling also can be criticised on efficiency grounds, both for the high expense in achieving very little and distorting existing markets.

1. The Costs of Recycling

Kerbside recycling is a relatively common exercise among municipalities as the frequent collection and easy participation encourages greater household participation. It is however expensive means for achieving minimal results. A recent English study (ERL, 1993) concluded that kerbside collection of recyclables is likely to yield sufficiently high levels of materials to raise significantly present low recycling percentages. However the very high collection fees associated result in significant costs. ERL estimates costs rise at least eight and a half times as much as bring-schemes (where people take recyclables to recycling centres), in order to raise the yield from 15% to 30% of the domestic waste yield. Further, even if disposal charges were set to internalise long run marginal costs of disposal, insufficient revenue is generated to fund the collection. A disposal cost of £40/tonne would

yield £520m, while kerbside schemes that might recover 33% of household waste would cost over £1,000m a year. These costs are seen disproportionate, given that household waste makes up around 6% of the total English waste stream.

The German Packaging Verordnung must be the most expensive recycling venture yet. The establishment and organisation of the collection and recycling system, Duales System Deutschland (DSD) is estimated to cost some 7 billion deutschemarks (\$NZ7 billion) and annual operating costs are running at 2 billion deutschemarks (\$NZ2 billion) (Schnurer, 1993). This equates to a cost of \$NZ75 per person per year to address (ineffectively) some 3-5% of the total waste stream, though a third of domestic waste. (In comparison, assuming 1 tonne/person/year domestic waste generation, the disposal of the remaining two-thirds of the waste costs about \$NZ100 per person year.)

A counter-argument in favour of the Ordinance, that neglect in the past has led to tens of thousands of potentially contaminated sites in Germany with clean-up costs estimated at between 50 and 100 billion deutschemarks (Schnurer, 1993) is fallacious. As noted above the materials used in packaging which the Ordinance addresses are essentially inert. Rather, the problems have been caused by the contents of the packaging and the production of those contents.

At local government level in New Zealand, many councils are involved in recycling initiatives. The most common approach is providing a recycling or drop-off centre for recyclables, though some councils are involved with kerbside collection. Direct

comparisons and analysis are difficult as different methods are used by different councils to assess their costs. Typically, the true costs of their landfills are likely to be understated and costs can be put more in perspective if compared against the costs of a new sanitary landfill, about \$35-50/tonne. Regardless, recycling costs are an order of magnitude higher than landfilling costs (table 6).

Council	Landfill Costs \$/tonne	Recycling Costs \$/tonne	Recycling budget (pa)	Comments
North Shore City	48	200-240		kerbside
Palmerston North	14	150		recycling centre only
Hutt City	18	100	480,000	kerbside
Wellington City	7.50	40-70	750,000	kerb trial, expanding
Christchurch City	40	150-250	300,000	kerbside trial

Table 6: Cost of municipal recycling schemes (data: various sources). Note: data are approximate and are calculated using different methods. They are indicative only.

Municipal recycling under any analysis is an expensive method to save landfill space. The justification that the opportunity cost of conserving landfill space by diverting waste by recycling does not equate with operations practice in New Zealand. The opportunity costs could be positive in some countries where disposal costs cost \$100 or more per tonne. However, even then, landfill costs may not represent even long-run marginal costs of disposal, but are set to force particular behaviour. The Toronto Metropolitan pricing seems an example of this, resulting in a tautological justification for its recycling scheme.

Many waste managers in smaller district councils in New Zealand attempt to avoid recycling schemes because of the cost. Others, both in New Zealand and overseas,

collect only items for which there are long term viable markets. Anne Prince, of Recycle NSW in her keynote speech to the Waste Management Institute of New Zealand conference (Prince, 1993), considers this approach is critical for successful kerbside collections, "... whilst the community might want to recycle everything... it is imperative for recycling to proceed cautiously and for each component of the waste stream to carry its own weight."

Such an approach makes economic sense. However it raises the question of why government should be involved in undertaking such a collection service. It merely emphasises that government is involved in recycling for recycling's sake rather than to meet any particular waste management goal.

Diverting waste from landfills may not reduce waste disposal costs. Alter (1986) noted modern disposal facilities have considerable fixed costs and relatively small variable costs. For example, most of the cost of a sanitary landfill is generated in obtaining consents, engineering works and capital such as haulers and compactors. These are needed at the start of the landfill's life and are independent of how much waste is delivered each day. Variable costs are salary and wages that are a small part of the total cost. These costs have to be paid regardless, especially if the development is funded by loans. In addition, Alter noted the quantities of waste diverted by recycling are within the seasonal variation in waste generation and therefore cannot be planned for to enable variable costs to be reduced.

2. *Distorting Markets*

The private sector is already involved in recycling. Tong (1989) calculated some 22,000 tonnes per year of waste were being recycled in Auckland, before the Auckland Regional Council started its operations. This ranges from commercial operations to not-for-profit sector fund-raising activities where labour costs are largely donated. Government intervention can distort recyclables markets by attenuating price signals through subsidising recycling or by ignoring market signals for regulating supply. This can itself lead to market failure, glutting the market from over-zealous collections can destroy fragile and volatile markets.

Municipal recycling schemes increases only the supply of raw materials without addressing the demand for them. Intervention effectively subsidises the production of recyclable materials raw materials through meeting collection, sorting and handling costs. They do not actively promote the use of the recyclable material.

The German initiative is already having a significant impact on world recycling markets. Its importance is to emphasise the consequences of distorting existing markets by increasing the recyclables supply, without also addressing their demand. The DSD already has a stockpile of 100,000 tonnes of plastic from its first year of operations. More than 450,000 tonnes were collected, though the domestic processing capacity is only 150,000 tonnes. Consequently, the price for plastics, and other recyclables, has plummeted.

Its other lesson is that the actions of a large country can have significant impacts on the international markets and on domestic markets. Asia has been a steady market for United States paper recyclers; the deluge of German paper offered free or, it has been claimed, with a payment to Asian buyers has now destroyed the market. British recyclers for example face a moral dilemma whether to accept very cheap German recyclables or to purchase recyclables from existing suppliers to foster their own domestic schemes. Clearly, the latter course reduces their competitiveness. Large quantities of German recyclables are also being exported to France, effectively replacing the French domestically generated recyclables now being dumped. The effect is the same as if German waste was imported into France for disposal (Biod, *et al* , 1994).

Also, if recycling schemes are successful in finding markets, they may dislocate the virgin materials market, or the market for other materials they are substituting. For example, producing plastic-wood for shipping pallets or construction reduces demand for wood, with consequent knock-on effects in the timber industry.

The effect on New Zealand domestic recycling markets from local government initiatives is unclear. Strong anecdotal evidence shows them to be very fragile as very few firms use recyclables. There appears to be a high turn-over of firms collecting recyclables and periodic gluts.

3. *Job Creation*

Recycling regimes can easily create jobs. Recycling requires large unskilled labour inputs to sort the rubbish and separate out the recyclables. Deciding who pays and the level at which the labour is paid are other matters. Labour costs are a significant component of municipal recycling scheme, and are critical for resources of already marginal value⁸. Recyclables are scavenged in third world countries by the destitute and indigent and it is likely that considerable volumes could be collected in New Zealand too, if it did not have minimum wages and if workers were to be paid internationally competitive wages (about \$0.50/day, James (1992)). Such a regime is morally abhorrent and subsidies would be necessary to pay the workers acceptable wages to sustain an uneconomic exercise. In this context recycling schemes become purely work-creation schemes funded by ratepayers.

Longer term, the value of recycling to create employment may diminish. Alter (1993) suggests aging populations will lead to a future shortage of workers. He suggests these workers are unlikely to want to work in a dull and dirty work-place for a minimal wage. He argues municipal recycling schemes in developed countries will be abandoned in the future on job-shortage grounds as a consequence.

⁸For example, Tong (1989) estimates a person can sort 300kg of rubbish an hour. The Manakau City tonne of waste containing \$21 will cost \$18.40 to sort at the minimum wage (\$6.13/hour), leaving \$2.60 to meet transport and other costs (and profit).

Chapter V. Discussion

The resource management issues underpinning the rationale for waste minimisation policies such as the externalities generated from disposal and the needs of future generations are important and need to be addressed. However a brief overview shows that these policies are unlikely to deliver any significant environmental benefit. Recycling regimes removing the commonly collected materials, such as plastic, glass and aluminium are unlikely to have a significant effect on the total waste stream and therefore on extending landfill life or reducing costs because such an insubstantial component of the total waste stream. The effect will vary within different communities, however.

Additionally, most municipal recycling schemes, notwithstanding their huge popularity and widespread adoption world-wide, distort solid waste management policies - the means have become the ends. They are often:

- developed and operated in an ad-hoc manner;
- marked by confused objectives and goals; and
- inefficient and ineffective means to achieve these goals and objectives.

The German regime provides a pertinent example of this. The level of involvement however varies between countries. Often central government is the driving force, as

is occurring in Europe. In the USA and Australia concurrent central and local government initiatives are being undertaken. Central government sets the overall target and individual states or local authorities establish their own implementation targets

New Zealand is somewhat different. Central government involvement is characterised by threatening to act rather than acting in any regulatory manner. As a consequence, central government, apparently through relative indifference and a strong concern to minimise expenditure, has avoided the pitfalls experienced by other governments. Instead, the initiative has been taken by local government authorities.

The underlying issue is that although many resource management issues that waste minimisation is supposed to address are real, government waste minimisation regimes are blunt policy tools that are relatively inefficient and ineffective. The danger is that because the means have become the end, for politicians, policy analysts and the public, the real problems will not be addressed.

In particular, New Zealand municipal recycling schemes are clearly uneconomic activities, and there is the appearance that New Zealand policy is driven by resource management problems that are neither applicable to New Zealand and that are unsuited to New Zealand conditions anyhow. Additionally, waste management problems and their solutions are not necessarily uniform within New Zealand.

links with government. These arrangements have treated government waste management activities quite differently from equivalent private sector activities, sheltering them from market checks and balances on the efficiency of operation. Rather they have been used to further political agendas, besides providing a waste management service to their citizens.

Cairncross (1992) identifies the cause of cost-oblivious and expensive waste management regimes as stemming from costs and benefits not being transparent and beneficiaries not bearing the true costs of disposal. Accordingly those bearing the costs are either not able to identify the costs or are unable to benefit by modifying their behaviour anyhow. Institutional arrangements, by not seeking to internalise costs, encourage private costs of waste disposal to be borne by the whole community.

New Zealand has similarly treated waste management and it is interesting to speculate whether the support for recycling expressed in the surveys would be as strong if the respondents were asked to indicate how much they individually would be prepared to pay to support a scheme. The Parliamentary Commissioner for the Environment (1993) identified this lack of cost recognition as a major cause of poor waste management by local authorities.

This opaqueness in New Zealand stems from former local government cash-accounting practices that did not show the true costs of waste management and from funding waste disposal from the general rate rather than on a user-pays basis. Waste

generators accordingly had no information or incentive to reduce waste, by either reducing generation or diverting it from the waste stream. Also, local councils were not required by the catchment boards to take the environmental effects of their disposal activities into account, although provisions were available to force them to under the Water and Soil Conservation Act 1967⁹.

These historical arrangements have been radically altered. The Local Government Amendment Act 1989 requires local government to use accrual accounting methods and the Resource Management Act 1991(RMA) require environmental externalities to be addressed. However the full costs may not be always included now as many facilities are being run and valued at historical prices and transitional arrangements still apply under the RMA, though this is likely to change. Equivalent reforms do not appear to have been undertaken overseas.

Institutional arrangements treating waste disposal facilities as if they constituted a special activity different from other potentially polluting land-uses also may create a waste crisis. This was identified earlier concerning Toronto Metropolitan. It also affected New Zealand applications under the old Town and Country Planning Act 1977, where demonstrating "need" was an important consideration in gaining planning permission. Under the new RMA, only actual and probable environmental effects of the activity need be considered, removing this test. Accordingly, a landfill for example, should now be treated no differently than any other activity. This is

⁹The Taranaki Catchment Commission was an exception, though the reasons for this cannot be explained (Bill Bayfield, Manager, Operations, Taranaki Regional Council, pers comm., 1994).

appropriate as data from some sites indicate other sources to be considerably higher polluters than the landfills¹⁰. It also suggests environmental management needs to be prioritised.

Germany is undergoing a rapid restructuring of its institutional arrangements regarding waste management with the Packaging Ordinance. However, this, too maintains the decoupling between beneficiaries and costs. Government, by establishing a framework only, has left the private sector to come to a solution to meet its needs. The result has been a private sector monopoly, the DSD, able to pass on costs to consumers who have no choice in recycling agency, or whether they wish to pay. Consumers can only influence the use of particular packaging media (note that these relate to costs of recycling the media, not the environmental costs of different media use and disposal) by their purchases.

Additionally, equity issues are raised. Packaging is a necessary part of post-industrial consumer societies. Consequently, any DSD surcharge on packaging items is equivalent to a private-sector levied consumption-tax as householders have little way of avoiding it. As a consumption-tax it is regressive in nature, impacting on lower-income earners more than higher-income earners. Also, the impacts may be even greater on lower-income earners as evidence shows this group is less able to afford to purchase grocery products in bulk. Rather, lower-income earners buy more

¹⁰The Greenmount resource consent Assessment of Environmental Effects showed the groundwater pollution was coming from other sources, such as farming (NDS, 1992). The Awapuni landfill consents application data showed biological oxygen demand pollution of the Manawatu River from the adjacent landfill was one-twentieth of that coming from the municipal oxidation ponds (PNCC, 1993).

items more frequently to meet their needs than more affluent groups (Rathje & Murphy, 1992). As a consequence any "tax" on individual packages, such as the DSD levy, will be paid more often by lower-income earners.

The underlying rationale underpinning most regimes are also flawed. There is also the indication that the existing institutional arrangements are predicated upon fallacious assumptions. The Waste Hierarchy that is used as the basis for justifying recycling and reduction schemes is suspect. Kirkpatrick (1993) argues that it is misleading, and does not consider the difference in values of different substances. Alter (1986) states that the Hierarchy was originally introduced as a System, without any hierarchical order. While reduction at source does make sense as a first step, and treatment and disposal a preferred end-point, the steps in-between, reuse, recycling, and recovery, are dependant upon the local facilities and geography, for reasons outlined earlier. Decision-making processes based on the waste hierarchy do not incorporate the full information necessary to ensure optimum environmental outcomes.

Accordingly, waste management solutions are not always and in all circumstances applicable. Rather they need to take account of particular geographical and social features both within and between countries. Solutions that are acceptable in one situation may not be appropriate in another. Developed countries' experiences give some valuable insights in waste management policy. However, the context is often different from New Zealand's, so that direction comparison or uncritical adoption of policy is unwise.

Problems from transferring policy from one locus to another occurs now in the European Union. The latest Draft Landfill Directive (OJ 1993 L 212/33) bans the use of co-disposal landfill sites within five years of the Directive coming into force. This would have ramifications for Britain which landfills 90% of its waste. The Directive would force the closure of half the 300 co-disposal sites that collectively receive 70% of industrial waste in the UK. UK lobbyists note that UK's high use of landfills reflects economic and physical reasons. It has thick impermeable clay beds that act as natural liners, a geological feature lacking in other member states. Germany prefers to entomb its waste, to prevent leachate escaping, which is reflected in the current Draft (O'Keeffe, 1993). The British Government is now seeking to lobby that properly managed co-disposal sites present no harm to the environment. The issue goes to the heart of subsidiarity (O'Riordan & Weale, 1989).

Waste management problems are therefore not necessarily universally applicable and the policy interventions necessary for one country's problems are not necessarily appropriate elsewhere. Those people supporting recycling as a means of "thinking globally, acting locally" are not also thinking locally. Recycling is now a global concept and the paradox is that uncritical support tends to be "thinking globally, acting globally" to address essentially local problems.

2. *Vested Interests*

As with any policy development that reallocates resources within society, some interests gain at the expense of others. The confused objectives of and demands on

municipal recycling stem from the multiple roles and goals of individuals within society as different interests each seeks to maximise its own welfare. Confusion arises as individuals have conflicts of interest. They are simultaneously waste generators, ratepayers or taxpayers who have to pay for any waste management policy implementation, and inhabitants of the environment in which their wastes are ultimately deposited. Each role has different goals, seeking to have their waste removed as effortlessly and cheaply as possible, but also without polluting their environment or endangering their health. The result is policy that reflects a form of cognitive dissonance, seeking to internalise others' externalities, while maintaining one's own.

Some parts of the private sector are disadvantaged by recycling interventions, notably the plastics packaging industry, which has been described as the material we most love to hate. However the private sector can exploit government recycling interventions in two ways.

Government environmental policy worldwide has created new and lucrative markets. It has been estimated the market for environmental goods and services was worth some \$US94 billion in Western Europe and \$US130 billion in the USA in 1992 (*The Economist*, 1993b). Waste management policy is no different. Recycling made up some 10.6% of the European market (nearly \$US10 billion). A survey of the trade magazines and trade fairs shows a wide range of manufacturers and suppliers of assorted recycling hardware (eg household sorting boxes, special garbage trucks, and machinery for sorting the waste stream), where previously there was none. Work is

created for consultants and other professionals to advise authorities how to implement waste strategies. The market in New Zealand created by local government recycling initiatives is unknown, but appears not insignificant.

Additionally, there is now a demand for private sector waste management operators to undertake recyclables collections and processing. For example, North Shore City now has a household rubbish collection consisting of three different collections. Municipal rubbish is collected first. A second truck then comes and collects recyclables, and then a third, independently operating truck collects waste paper. The first two collections are funded by ratepayers, though partial user-pays applies to the municipal collection. The market is captured as ratepayers have very little choice about paying for their collection. Markets also are opened for consultants, advising local authorities how best to manage their wastes and meet the requirements of the legislation

National level regimes also provide advantages to some parts of the private sector. Mandatory recycling regimes, such as the DSD system, effectively act as non-tariff trade-barriers (eco-barriers) restricting access to domestic markets to importers. The DSD is apparently "supported" as it provides a very effective means of placing extra costs on external suppliers to the internal market, as they have to make special arrangements to dispose of their waste. For example, the Belgian and French bottled table-water industry has had to establish special recyclable container production lines for the German market. It is notable, too, that Denmark was taken to the European Court in 1988 on the grounds that its Bottle Act, requiring all beverage bottles to be

reusable, formed a trade-barrier protecting the small domestic brewing industry. Additionally, reports cite the copying of aspects of the German Ordinance, in part at least, such as the French Eco-ballage for levelling the playing field.

Leading the field, as the Germans have done, has also been beneficial to the originating country. Every time the EU adopts a German-sponsored green law it creates more export opportunities for Germany's environmental firms elsewhere in Europe (*The Economist*, 1993b).

Larger exporters in the exporting countries also can gain advantages, for having established arrangements for disposing of wastes in the destination countries, they then have near monopoly, or at least significant competitive advantage over smaller rivals. For example, UEB-Packaging in New Zealand has done considerable work arranging access to the German market. It is now able to offer this service to its clients.

B. The Role of Government in Waste Management

These arguments, while relevant to policy implementation, do not address the underlying issue, of whether governments should be involved in waste management at all. Governments have had and many continue to have a significant role in waste management, as well in causal matters, viz the regulation (and consequent deregulation) of domestic milk supplies and imposition of tariffs and import restrictions favouring particular media, eg glass, the role has largely been

unquestioned. None of the Ministry for the Environment papers (1987, 1989, 1991) considered what role either central or local government needs to play in waste management. This is perhaps understandable, in that municipal collections and landfills are clearly the function of local government under the Local Government Act - the first private sector municipal landfill (at Redvale) only opened in 1993. (Many district councils now contract out household collection or landfill operations and management, however they retain the responsibility for the functions.)

Other than the inertia of practice, the extent of government involvement is queried. In France, over 60% of collections are private sector, and there has been the development of privately owned and operated landfills in New Zealand over the last few years. Additionally, local government recycling schemes commonly tend to compete for particular materials in the domestic waste stream for which markets exist. They are directly competing against or displaced other collectors to supply recycling merchants, whether these are children, youth and community groups (eg the boy-scout paper chase) or commercial collectors (the North Shore City kerbside collection was placed in jeopardy by private collectors raiding householders' recycling bins before the official collectors arrived). These all indicate the market is capable and willing to be involved in waste management activities.

The main argument against a more minimalist involvement in favour of the private sector is that monopoly situation would likely occur and net social welfare would therefore decrease. However there are cogent arguments that ownership is less important than the presence of competition to optimise welfare (Helm, 1986). A

greater private sector involvement in waste management service delivery does not necessarily mean that citizens would be worse off than now, as welfare is more likely to depend on establishing performance criteria that internalise externalities. Also, it can be argued that the existing government near-monopoly has not provided a particularly efficient system or avoided creating externalities.

Chapter VI. Theoretical Underpinnings for Government Failure

A fundamental question remains, however. Given that government intervention in waste management is shown to be inefficient and ineffective and that it can be argued that it is not strictly necessary to be involved to the extent it is, why does government intervention continue to exist without being checked?

A. Policy as Politics

Ultimately environmental policy-making is a political affair (Rosenbaum, 1985). While government involvement in waste management can be questioned on "rational policy analysis" grounds, waste management is ultimately more than a professional delivery of particular services in the most effective and efficient manner possible. Rather it is about what people want, as opposed to what they need.

The political element of policy-making is not always recognised, either among policy analysis theorists (eg, Stokey & Zeckhauser, 1978), various natural resource economists (eg, Tietenberg, 1988; Ackroyd *et al*, 1991) and others addressing policy matters from a neo-classical economic vantage. The title of David Stockman's political autobiography, *The Triumph of Politics* (1987), is a rueful admission, too late, of this in his position as head of the Office of Management and Budget under President Reagan.

The importance of politics has not been always apparent to environmental policy practitioners in New Zealand or overseas, many of who regard their activities as disinterested (Bührs & Bartlett, 1993; Grundy, 1993). Blowers (1986) noted [town] planners accepted planning was political only in the narrow sense that it is elected politicians who take the decisions (p14). However, by affecting a fastidious political neutrality town planners have in practice co-opted with those interests which hold greatest economic and political power (p16).

A similar case can be made for district council managers responsible for service delivery, including waste management. This is even less obvious than for those involved in policy, but is every bit as significant. Many responsibilities for service delivery are made by elected Council Committees, eg the Works Committee, on the advice of their engineers. The politicians make decisions based on their political acumen, grounded on the technical information the engineers provide. This advice is likely to reflect the engineer's own perceptions of what is important.

Political decision-making processes may value resources and goals differently from the market, as different values are applied. Accordingly, economic inefficiency results where government requires administrators to ignore the costs of intervention, so that the net benefits are unknown or negative in order to attain other political goals. Rosenbaum (1985) considers this the consequence of "cost-oblivious" legislation. Such legislation may result in compliance costs being greater than the public benefits accruing from compliance. Hahn (1989) notes that very frequently very strong political forces are in play that constrain what can and cannot be done.

Because politics has such a strong impact on the shape of environmental policy, programmes are rarely designed with economic efficiency as a primary goal (Hahn, 1989, 5).

Recognising and explaining this inefficiency on theoretical grounds is less easy. Wolf (1988) points out that while formal theories exist to explain market failure, predicated on neo-classical microeconomic concepts of externalities, no equivalent theoretical framework exists to support government-failure observations. He considers public choice theory is an important element in development of such a comprehensive theory. The self-interest of politicians and bureaucrats (and sectorial interests) are an important factor in understanding nonmarket processes. He suggests other factors need to be considered in providing any comprehensive explanation for nonmarket, including government, failure.

B. Public Choice Theory as Explanation

Government intervention in recycling is essentially regulatory, restricting individual choices and may be coercive, requiring certain behaviour, as well as being redistributive.

A considerable body of literature exists on government failure and its causes, focusing on the regulatory activities of government agencies. While some, such as Bernstein's clientele capture of regulatory agencies (Bernstein, 1955), have enjoyed considerable support in the past, they have more recently been somewhat discredited

on theoretical and evidential grounds (Sabatier, 1975; Conybeare, 1982).

Importantly, Bernstein and his critics agree that any governmental agency intending to regulate behaviour to minimise harm on third parties will be involved in political controversy regarding the authoritative allocation of values. Besides expertise available to the agency, it must have the legal or political resources to convince or coerce producers into changing their behaviour. These last two variables are seen as the principal limiting factors in deciding the ability of regulatory agencies to sustain any aggressive programme of action over time (Sabatier, 1975, 305).

The theory of public choice and closely related theories of bureaucracy are claimed to provide rigorous, testable propositions connecting the supply of government regulation with the demands of group interests in society by explaining how these political resources are harnessed (Conybeare, 1982). They are predicated on the application of economic theories of rational self-interested behaviour to the explanation of government and collective political action. Although often considered to be synonymous with "new-right" or neo-conservative policy-making, public choice is claimed to provide a rigorous analytical structure and has been used by theorists extending to marxists (Dunleavy, 1991).

1. Economic Theory of Bureaucracy

Niskanen's model (1971) predicts agency bureaucrats will, in seeking to expand their budgets, indulge in excessive regulation. As a result, the borders of the state expand, undermining individual liberty and disrupting economic growth. Resources

are reallocated to those who help promote agency growth, giving a similar capture by clients as Capture Theory proposes. Niskanen's budget maximisation hypothesis suffers from empirical failure (Conybeare, 1982). Evidence in New Zealand shows little connection between departmental size and status, or between departmental size and employees' salaries (Boston, 1991).

Applied to recycling, the theory predicts employees and managers within agencies would promote recycling to increase their own span of control and status. Recycling parts of government agencies should therefore be conspicuous. However, the strong public support for recycling suggests regimes are motivated in part by exogenous factors, outside the bureaucracy, independently of any internal bureaucratic motivation.

2. Theory of Democratic Voting and Interest Groups

The theory of democratic voting and interest groups suggests regulatory failure may occur before bureaucratic implementation is reached. It is predicated on the assumption votes will be used to buy services and that therefore regulation should reflect the preferences of most of the electorate. Political parties to maximise votes should supply regulation desired by the median voter. However, this has been inconsistent with observations that regulation appears mainly to benefit only small fractions of the voting population, unless vote trading and coalitions are allowed for. The application of Director's Law (Stigler, 1970) predicts the democratic governments will redistribute income from both the poor and the rich toward the

middle classes. Evidence for this is mixed, but would appear to have some relevance in environmental policy formulation, at least (Conybeare, 1984).

Intuitively, enterprises could be expected to seek minimal government intervention, seeking a *laissez-faire* market-place free from government induced distortions. However, Stigler (1971) introduced the concept that regulation is a normal good that governments will supply to those willing to pay for them in either resources or votes. This "producer protection model" considers regulation is an alternative to private cartellization and will be sought by industries wanting subsidisation, control over entry, suppression of substitutes, promotion of complementary products and price fixing. The benefits of regulation are more concentrated than the costs, the benefits accruing to the regulated industry while the costs are paid by the population as a whole.

This model however, does not explain regulation where the benefits are diffuse and the costs concentrated. Conybeare considers the most likely explanation for such regulation is a pure democratic model, since diffused benefits may attract more votes than will concentrated costs. The issue then becomes that of identifying the incentives for any one member of a large group of beneficiaries for regulation to provide the necessary leadership to press for regulation, the classic problem of the public good. The usual explanation is in terms of political entrepreneurship either for the mobilisation of mass pressure or for direct appeal to voters. Whether the entrepreneur will seek to maximise support or to achieve minimum necessary support will depend on the uncertainty of support and the marginal gain from additional

votes. The political entrepreneur is one who "invests his own time or other resources to coordinate and combine other factors of production to supply collective good, and will derive private gains from supplying a collective good" (Frohlich & Oppenheimer, 1978).

To summarise, public choice theory of democracy and group behaviour provides two hypotheses for regulation:

- the producer protection model explains how some concentrated interests are able to "buy" regulation at the expense of more diffuse interests;
- the democratic entrepreneurship model explains how diffused beneficiaries are able to "buy" regulation at the expense of concentrated interests (Conybeare, 1982).

3. *Applying Public Choice Theory to Municipal Recycling*

Recycling is a political matter and many government officials involved in waste management practice and policy informally reject most reduction and recycling ventures. In New Zealand, for example, some Regional Council managers acknowledge the policies recycling in their planning documents such as Regional Policy Statements and Regional Plans are largely cosmetic and are included to meet political and perceived public interest. Also, some district council waste managers

The New Zealand industry groups are currently working with the Ministry for the Environment to establish voluntary standards for New Zealand waste reduction.

While these groups seek to minimise government intervention, casual evidence suggests elements of the private sector of the waste management industry in New Zealand and overseas are seeking greater regulation. Larger enterprises are lobbying for tighter controls on landfills and hazardous waste disposal, for example. *The Economist* (1994) reported concerns by the English National Association of Waste Disposal Contractors that "[1993] was the year that never was" when "fears grew of a wholesale dismantling of environmental-protection regulations." The government had twice postponed a new licensing scheme that would drive the smallest, cheapest waste managers out of business. A study by KPMG Management Consulting had suggested the delay had postponed £1 billion of investment.

An interesting variant on this is starting to appear in New Zealand as the larger waste management firms start to utilise the RMA. The RMA is enabling legislation and Waste Management (NZ) is trying to raise the regulatory standards through the public participation process. Waste Management (NZ) has a state-of-the-art landfill at Redvale. It is now making submissions against council owned metropolitan landfill resource consent applications (Wellington and Timaru to date) on the grounds they are sub-standard activities. Successful submissions have the effect of raising landfill costs, as councils are forced to raise the standard of their operations, and potentially force some to close in favour of other waste disposal options.

Policy Entrepreneur

Environmental issues can be expected to be ripe for prospective policy entrepreneurs. Public awareness and interest about environmental issues world-wide (Kraft & Vig, 1990) including New Zealand (Bühns & Bartlett, 1993) are greater than they ever have been. Waste issues also feature highly among peoples' concerns. Waste management is the third most important environmental issue in Germany for example (Schnurer, 1993).

Environmental interest groups are endogenous, in that they have no predetermined identity, and low entry and exit costs. Where political entrepreneurs emerge, they have to supply basic common denominator goods to the public at least cost (see Dunleavy, 1991). Municipal recycling is an obvious candidate for basing public action because of the high profile and common-place nature of the recyclable waste. It is a simple activity requiring minimal change in habit and lifestyle. In addition, it plays on the very strong "waste-not want-not" ethic prevalent in society. It is an activity everyone can identify with.

The German Federal Minister for the Environment, Klaus Töpfer, is an obvious policy entrepreneur. He sponsored and champions the German Packaging Ordinance and consequently is a household name in Germany and is recognised internationally. The Ordinance is controversial, but is never-the-less an effective promotion vehicle for him. Importantly, he has not addressed the more important elements of the waste stream such as concrete and demolition, or even newspapers within the

Director's Law

The evidence suggests Director's Law, where resources are reallocated to benefit the middle classes at the expense of upper and or lower classes, may apply in Germany, at least. As was identified earlier, the DSD levies act as a regressive consumption-tax. It therefore reallocates resources from the poor to support middle class ideals. The full extent of the application of this law in New Zealand is unclear, though user-charges to support or encourage recycling are likely to have a similar effect.

Niskanenian Bureaucrats

Casual evidence exists consistent with the economic theory of bureaucracy. The success of both the earlier composting work sponsored by the Interdepartmental Committee on the Utilization of Organic Wastes (CUOW) and recent recycling ventures appear to depend on the enthusiasm of particular individuals for their success. The Sixth Report of CUOW (1972) reviewed what had happened to the original government sponsored municipal composting schemes. It found other than the Auckland plant, that "all have had temporary success due to the enthusiasm of individuals, but have not sufficiently attractive to warrant the effort needed to continue them" (p9). Similarly, the success of the Auckland, Manakau and Wellington City recycling schemes at least can be attributed in part to the very enthusiastic and dedicated work by a few staff members to make them work.

The actions of these enthusiastic people could be seen as only partly fitting the mould of policy entrepreneurs, however they are not necessarily seeking to gain

political or other public advantage from promoting these schemes. Rather, they could be seen better to fit the Niskanenian model, as their actions expand to become important and growing parts of the organisations in which they work. Recycling has become significant budget centres in the councils concerned where previously they did not exist.

Also, the packaging studies carried out by the Ministry for the Environment, like the earlier composting study developed from an original issue into having a life of its own. The packaging studies originated as a request by Cabinet for an environmental impact assessment of the Government's intention to deregulate the town milk supply, and the likely impact this would have on bottled milk. The first study was substantially increased in scope by those involved in a manner not inconsistent with Niskanen's theory. However, more research is needed to validate this hypothesis.

C. Alternative Explanations

The public choice theory of regulation does not account for many local and central government initiatives in New Zealand. In the absence of any clearly visible policy entrepreneur, many councils have responded to provide some form of recycling initiative. At the least, government at all levels have responded by providing placebo policy and a plethora of reports. Similarly, the concentrated interests can be seen as not so much lobbying for recycling, but have rather responded to opportunities local government intervention has created.

Rather, the collective demand from many individuals appears to have had some effect and in some councils, councillors appear to respond by supporting schemes primarily to appease voters. Several councils have voted or at least not opposed recycling ventures without significant policy entrepreneurship. Although some entrepreneurship may have been required to put the venture on the council agenda, little action is necessary to achieve support.

Wolf (1988) suggests poor or "captured" information flows to decision-makers and a self-regarding interpretation of this information may better explain nonmarket failure. He suggests five conditions for nonmarket demand:

- 1 increased public awareness of market shortcomings;
- 2 political organisation and enfranchisement;
- 3 the structure of political rewards;
- 4 the high time-discount of political actors; and
- 5 decoupling between burdens and benefits (Pp39-41).

These suggest less emphasis on individuals and small groups and a greater emphasis on the institutional arrangements that encourage short-term responses to issues and which rewards decision-makers for doing so. It also suggests an underlying cultural

or social element where ideas evolve and take hold as popular issues to allow these arrangements to persist.

In this regard the politics of recycling can be understood as a cultural or popular response to particular issues of our times. In this context recycling is a tangible way for individuals to do their bit for the environment in a way that does not cost them (directly) in any significant way. People are concerned about the environment, but they are not necessarily prepared to sacrifice too much for it. The intrinsic environmental value of the action is less important than the community genuflection before the idea.

This "*Zeitgeist*" explanation may have credence when it is considered recycling is one of the few tangible means for lay-people to participate in an increasingly esoteric policy environment. Ruckelshaus (1985) notes that environment policy issue definition is undergoing metamorphosis as more obvious and immediate issues such as water and air pollution are brought under control, and attention focuses on more insidious issues. He describes this as science led, where detection of harmful substances and conditions is undetectable to the lay-person. For example, chemical contamination of ground-water, and domestic products, such as dioxin in bleached paper food containers can only be detected with advanced specialist equipment. Similarly, global environmental issues, such as ozone layer depletion and global climate change are not readily observable. Indeed arguments among scientists continue as to the rate that these phenomena occur and the significance they have. Also, the effects of these phenomena do impact on the lives of ordinary people who

are increasingly concerned and active in addressing these matters.

Wolf also suggests nonmarket failure is generated from poor or mixed information to decision-makers. This, too, has relevance in explaining recycling. As discussed earlier, decision-makers face considerable uncertainty as to what is the best course of action for improving environmental welfare. Analytical techniques, such as life-cycle analysis are theoretically able to evaluate the relative merits of particular goods and production processes and the use of resources. They are in reality difficult and slow to perform and provide ambiguous results.

In the face of such information paucity, and given the abundant information provided by overseas experts in august organisations such as the OECD, waste managers have every incentive to adopt waste management strategies based on this information. A waste manager would have to have considerable confidence to suggest the collective findings of international experts are wrong, at least for his or her district council. At the same time, environmental groups and organisations have good information networks and have access to international developments, too. They are in no better position than the waste managers to evaluate the information they receive, or to identify or assess the modifications to the general principles necessary to apply them successfully to local conditions. In these circumstances means become the ends in developing public policy.

D. Assessing the Theory

Political theory of regulation fits and explains much about the existence of recycling regimes using anecdotal evidence and it appears a plausible conceptual explanation. However, attempting to apply the model raises several issues regarding validation. Obtaining the necessary evidence is difficult. It relies largely on observations, using media reports of public lobbying and comments from participants. Self-regarding behaviour of individuals concerned means falsifiable data are impossible to find, if only because lobbying is by its nature not always an open process.

Accordingly, it is difficult to ascribe with confidence the degree of cause and effect. Government reluctance to act on packaging may partly result from successful lobbying by concentrated interests. But this is not necessarily the case as other less obvious or conspiratorial forces also may operate. For example, the 1989 packaging report was seen as an industry hi-jack of the pro-recycling 1987 report recommendations (Friends of the Earth, 1990). However, the authors of the second report considered they were impartial, but canvassed issues largely ignored by the previous report team. They introduced an economics focus lacking in the first and examined the opportunity-costs of recycling as opposed to other policy options. The difference between the two reports can be explained by the two sets of authors using different value-sets and reference points to give different policy solutions, rather than relying conspiracy or capture explanations.

The other significant validation problem is in identifying the policy entrepreneur.

Presumably, policy entrepreneurs can operate at different levels, matching the different levels of government. Local policy entrepreneurs are however unlikely, because of their local scale of activity, to be widely recognised. The policy entrepreneur theory indicates the policy being promoted is a stepping stone to other, greater things. Accordingly, the policy entrepreneur will only be recognised if he or she succeeds in these other activities. Success becomes very relative in this context. Accordingly, in this sense the theory is explanatory and cannot predict the outcomes of policy entrepreneurship, either for the policy or the entrepreneur. Conybeare's (1982) claims for the advantages of public choice theory over other competing theories appear less strong in this light. It may not therefore be quite the silver-bullet policy theory some envisage.

Also, it does not explain cultural issues, for example, why the *Zeitgeist* that favours recycling should prevail. Rather, the need to widen the scope of explanation to include social factors such as culture and networks, as Berg (1985) suggests, may be needed to provide a more comprehensive explanation.

Chapter VII. Conclusion

This paper examined a particular aspect of environmental policy to assess the value of the policy and whether its adoption and implementation could be explained within existing theoretical framework.

A. Recycling as Policy Revisited

Recycling regimes and the call for more government intervention to support municipal recycling are based on the need to build a better, sustainable future. However, all the indications are that while such interventions are beneficial to various interests, the environmental value of interventions appear minimal, and may even have a net environmental cost. Importantly, individuals and markets will respond to any change to institutional arrangements, taking account of the values promoted by those arrangements, in order to maximise their individual welfare. These may not necessarily result in increasing overall environmental or social welfare. Their success however may mask the underlying costs to society.

The Public Choice paradigm suggests environmental public policy will be less decided by the "intrinsic" need or worth of an issue, than the relative access to and influence of decision-makers. Environmental outcomes are politically derived, or must be politically driven to gain acceptance. Any "pure" environmental goal based on ecological principles is doomed to oblivion, or at best lip-service. Despite any underlying survival imperative, environmental goals are treated as part of a range of

politically derived goals. Administrative and institutional resources and arrangements will reflect not ecologically derived, but the most politically sufficient policies. Policy outcomes may only incidentally be effective, efficient or equitable. Rather they will be the expression of the goals of particular sectors of society, which may only co-incidentally agree with environmental goals.

Accordingly, a strong case for a more minimalist government can be made using waste management as a case study. Government intervention to regulate for increased municipal recycling or to undertake recycling collections itself can be criticised as ineffectual in increasing overall environmental well-being and very expensive, while also distorting existing recyclables markets. This does not exempt government from having a role, but rather underlines the high economic and environmental costs of unnecessary intervention.

Current recycling regimes, throughout the western world can be criticised on fundamental grounds they are established. It appears that many problems recycling regimes are introduced to address are in turn the result of other constraints and distortions arising from interventionist institutional arrangements. It therefore seems more appropriate to focus policy initiatives to address these issues rather than using blunt multi-purpose, silver-bullet policy solutions such as recycling.

Fundamentally, recycling as a policy focus reflects a failure to recognise wastes are resources and that the way they are used is essentially no different from any other resource. The issues addressed by recycling are often of some significance, and the

three issues identified in the beginning of this paper, pollution from waste disposal practices, shortage of disposal facilities and the need for resource conservation are all important. They are aspects of wider resource management issues, and wastes need to be managed accordingly.

Waste management provides a clear example of a proper role of government to be to set and enforce boundary rules within which market forces determine how best social demands are to be met and benefits allocated, rather than a command-economy approach. Greater environmental welfare would come from restructuring institutional arrangements so that:

- clear controls on the take and discharge of resources from the natural environment so that externalities are internalised; and
- local government activities are carried out in an accountable and transparent manner, so that costs and benefits can be identified, and costs are coupled to benefits.

In New Zealand, recent reforms have provided such a framework, however because of transitional arrangements from the old to new regime and because of historical pricing, the effects are not yet widely observable. Rather than seeking to establish new arrangements, such as voluntary or mandatory standards, policy-makers need to wait for the new regime to establish itself and markets and waste managers to respond to the new information signals.

One lesson of recycling in New Zealand is the importance of not adopting received wisdom regarding and addressing environmental problems in other countries. New Zealand is unique as a developed country with its heavy reliance on primary industry and without a significant industrial element producing either wastes associated with other industrialised countries or in quantities experienced by others. Additionally, the population base means that overall generation and the ability for the environment to assimilate adverse effects may be considerably different. This does not mean New Zealand does not have potentially serious environmental problems but that solutions are likely out of necessity to be specific to New Zealand conditions. They may not necessarily be appropriate to overseas circumstances.

The current environmental maxims, the "polluter pays", and "think globally, act locally" both apply to waste management. But those wishing to implement them, need first to think through what these maxims really mean.

Polluter Pays, ultimately means the consumer pays, which means individuals in society. And if they are to pay, they should have the choice of who they should pay. By relating costs to benefits they can then optimise their purchasing and disposal to minimise their waste and be rewarded for it. They may prefer to pay in kind, and promote recycling, or they may pay for the convenience of a waste disposal service.

Similarly, think globally, act locally, requires recycling promoters and supporters also to think of the local implications of their actions. Acting locally, to promote

overall global environmental welfare may not mean adopting global solutions, but rather applying locally beneficial solutions. Even national solutions may not be appropriate in a geographically variable country such as New Zealand.

There is a growing recognition in New Zealand that recycling is not an end, and increasing calls are being made for a greater focus and emphasis on reducing waste at source (PCE, 1993; Bailey, 1991). This would seem a more fruitful policy direction to encourage.

B. Theoretical Underpinnings Revisited

Public choice theory is gaining greater acceptance within the Western World for explaining policy formulation and implementation. It is also increasingly being used as a model for developing public policy. For example, the New Zealand bureaucratic revolution in the 1980s borrowed considerably from it (Boston, *et al*, 1991). The public choice theory of regulation and voting is very plausible for explaining recycling and waste management policy. The explanation is logical and appealing.

However, despite the rational or positivist claims of its supporters, this attempt to apply one of the stable of closely related theories is disquieting. The theory is not easy to validate, as ultimately there are too many subjective decisions to be made in fitting the data. There are too many difficulties in identifying policy entrepreneurs. Similarly, substantiating the prediction that concentrated interests will capture the

policy process is difficult. By the nature of their activities, interests are not likely to reveal their position or intentions.

Other elements also may be as important in causing nonmarket failure, including other theories from the Public Choice stable and others drawing on the cultural context within which policy is developed and implemented. Consequently, the theory's supporters' claim for the mantle of rationality and positivism need to be reconsidered. Whereas the theory may ultimately be positivist, proving it may be less easy, so that a question-mark hangs over it. In this light, its whole-sale adoption by policy-makers is questioned.

References

Ackroyd, P. *et al*, (1991), *Environmental Resources and the Market-Place*, (Allen & Unwin: Sydney).

Alter, H., (1989), The Origins of Municipal Solid Waste: the Relations between residues from Packaging Materials and Food, *Waste Management & Research*, 7, 103-114.

Alter, H., (1991), The Future Course of Solid Waste Management in the U.S., *Waste Management & Research*, 9, 3-20.

Alter, H., (1993), The Origins of Municipal Solid Waste: II Policy Options for Plastics Waste Management, *Waste Management & Research*, 11, 319-332.

Bailey, ML, (1991), *Producing Less Waste: An Informative Paper on conserving Resources and Reducing Rubbish and Pollution* (MfE: Wellington).

Berg, O, (1985), Public Deficiencies: Comments on the Theory of Nonmarket Failure, *Scand. Pol. Stud.* 8: 129-150.

Bernstein, M., (1955), *Regulating business by independent commission*, (Princeton: Princeton UP).

Biod, A., Probert, J., & C. Jones, (1994), Waste Collection in France: recovery or collapse, *Warmer Bulletin*, 40: 12-13.

Blowers, A., (1986), Town Planning - Paradoxes and Prospects, *The Planner*, Apr., 11-18.

Boston, J., (1991), The Theoretical Underpinnings of Public Sector Restructuring in New Zealand, in: J. Boston, *et al.*, (eds.), *op cit*.

Boston, J., *et al* (eds), (1991), *Reshaping the State: New Zealand's Bureaucratic Revolution*, (OUP: Auckland).

Brundtland Commission [World Commission on Environment and Development], (1987), *Our Common Future*, (OUP: Oxford).

Bührs, T. (1991), *Working Within Limits: The Role of the Commission for the Environment in Environmental Policy Development in New Zealand*, Ph.D. thesis, University of Auckland.

Bührs, T. & R V Bartlett, (1993), *Environmental Policy in New Zealand: The Politics of Clean and Green?* Oxford Readings in New Zealand Politics: No. 3. (OUP: Auckland).

Cairncross, F., (1992), *Costing the Earth: the challenge for governments, the opportunities for business*, (Harvard Bus. Sch.: Boston).

Centre for Advanced Engineering, (1993), *Our Waste, Our Responsibility*, (CAE, University of Canterbury, Christchurch).

Charles, D., (1992), Too many bottles break the bank, *New Scientist*, 18 April: 12-13.

Conybeare, JAC., (1982), Politics and Regulation: The Public Choice Approach, *Austr. Jl. of Public Admin.*, **41**: 33-45.

CUOW, (1951), *Second Interim Report of the Inter-Departmental Committee on Utilization of Organic Wastes*, reprinted from: *N.Z Engineering*, **6**, nos. 11-12.

CUOW, (1969), *Survey of Municipal Refuse Composting in New Zealand, Fifth Report of the Committee on Utilisation of Organic Wastes*, (MoWD: Wellington).

Deadman & Turner, (1988), Resource Conservation, sustainability and technical change, in: RK Turner (ed), *Sustainable environmental management: principles and practice*, (Belhaven: London).

Denne, T., Livesey, C., & J. McNeill, (1989), *Packaging and the New Zealand Environment: Critical Aspects of Resource Use and Waste Management*, (MfE: Wellington).

DGFV (1987), *Verpacken ohne Kunststoff (Packaging without Plastics)*, German Socieity for Research into the Packaging Market.

Dunbar, FC., & MP Berkman, (1987), Sanitary landfills are too cheap! *Waste Age*, **18** (5 May), 91-99.

Dunleavy, P., (1991), *Democracy, Bureaucracy and Public Choice: Economic Explanations in Political Science*, (Harvester Wheatsheaf: Hemel Hempstead).

ECO [Environmental and Conservation Organisations of New Zealand], (1993), *Have your Say: Guidelines for community input into regional policy statements and regional and district plans*, (ECO: Wellington).

Economist, The, (1993), The money in Europe's muck, *The Economist*, 20 Nov.: 75.

Economist, The, (1994), Regulate us, please, *The Economist*, 8 Jan.: 65.

Environmental Resources Limited (1993), *Economic Instruments and Recovery of Resources from Waste*. Report for Depts. of Trade & Industry and Environment, (HMSO: London).

- Ferguson, R.G., (1992), The 3Rs (Reduce, Reuse, Recycle) of Solid Waste Management in Metropolitan Toronto and the Province of Ontario, *ISWA Times*, 2: 17-19.
- Frohlich, N., & JA. Oppenheimer, (1978), *Modern Political Economy*, (Prentice-Hall: Englewood Cliff).
- Grundy, KJ., (1993), *Sustainable Development : A New Zealand Perspective*, Env. Policy & Mgt Centre, University of Otago Publication No. 3. (EPMCUO:Dunedin).
- Gunnerson, CG., & DC Jones, (1984), Costing and cost recovery for waste disposal and recycling, *Waste Management & Research*, 2: 107-118.
- Hahn, R.W., (1989), *A Primer on Environmental Policy Design*. (Harwood: Chur).
- Helm, D., (1986), The Economic Borders of the State, *Oxford Rev. Econ. Policy*, 2, no.2, i-xxiv.
- Henning, DH. & Mangun, WR., (1989), *Managing the Environmental Crisis: Incorporating Competing Values in Natural Resource Administration*, (Durham: Duke UP).
- Hickman, HL., (1992), Looking at Municipal Solid Waste Composition and Mandatory Removal Rates in North America, *ISWA Times*, 2: 2-3, 13.
- Hirshfeld, S., Vesilind, PA., & EI. Pas, (1992), Assessing the true costs of landfills, *Waste Management & Research*, 10, 471-484.
- James, C., (1992), *New Territory: the transformation of New Zealand 1984-92*, (Bridget Williams: Wellington).
- Kirkpatrick, N., (1992), *Selecting a Waste Management Option using a Life Cycle Analysis Approach*, paper presented at conference: Life Cycle Analysis; cited in *Warmer Bulletin*, 37: 7.
- Kraft, ME. & NJ. Vig, (1990), Environmental Policy from the Seventies to the Nineties: Continuity and Change: in NJ Vig & ME Kraft (eds), *op cit*.
- Lang, W., (1991), The International Waste Regime, in: W. Lang, H. Neubold & K. Zemanek (eds), *Environmental Protection and International Law*, pp. 147 - 166 (Graham & Trotman).
- Lidgen, K., (1986), The Economics of Recycling - A Matter of Life or Death for the Recovery Sector in the 1980s and 1990s, *Resources & Conservation*, 12, 175.
- Meadows, DH., Meadows, DL. & J. Randers, (1992), *Beyond the Limits: Global Collapse or a Sustainable Future*, (Earthscan: London).

Meadows, DH., Meadows, DL., Randers, J. & WW. Behrens III, (1972), *The Limits to Growth*, (Universe: NY).

Memon, PA., (1993), *Keeping New Zealand Green: Recent Environmental Reforms*, (Otago UP: Dunedin).

Ministry for the Environment, (1987), *Packaging in the New Zealand Environment: Issues and Options*, (MfE: Wellington).

Ministry for the Environment, (1991), *Directions for Better Waste Management in New Zealand: A Discussion Paper*, (MfE: Wellington).

Ministry for the Environment, (1992a), *The Government Waste Policy and Ministry for the Environment Waste Work Programme*, August 1992. (MFE: Wellington).

Ministry for the Environment, (1992b), *Landfill Guidelines* (MfE: Wellington).

Ministry for the Environment & Ministry of External Relations and Trade, (1992), *New Zealand's National Report to the United Nations Conference on Environment and Development: Forging the Links*, (MfE & MERT: Wellington).

Nicholas, P., (1974), *Robbie of Auckland*, (Whitcombe & Tombs: Auckland).

Niskanen, W., (1971), *Representative bureaucracy*, (Aldine-Atherton: NY).

Northern Disposal Systems, (1992), *Greenmount Landfill Overlay Project: Application for Resource Consents and Assessment of Environmental Effects*, (NDS: Auckland).

OECD, (1975), *The Polluter Pays Principle: Definition, Analysis, Implementation*, (OECD: Paris).

O'Keeffe, J., (1993), Comment: EC Law, *Warner Bulletin*, 39: 9.

Palmerston North City Council, (1993), *Awapuni Landfill: Application for Resource Consents*, (PNCC: Palmerston North).

Parliamentary Commissioner for the Environment, (1993), *Local Authority Solid Waste Reduction Initiatives: Report on Four Case Studies*, (PCE: Wellington).

Prince, A., (1993), *Sydney - A Recycling Success Story. The Role of Local & State Government, Industry and the Community*, paper presented WMINZ Conf. Wanganui.

Rathje, W. & C. Murphy, (1992), *Rubbish! the archaeology of garbage*, (Harper Collins: NY).

- Robinson, B., (1991), *Reduce, Reuse, Recycle, Minimise!* Paper presented Waste Minimisation & Recycling in the Urban Environment, 2nd Env. Mgt. Conf., IIR, Auckland.
- Rosenbaum, WA., (1985), *Environmental Politics and Policy*, (Congressional Qtly: Washington).
- Royds Garden Ltd, (1991), *Waste Management Surveys: A National Compilation of Data*, (Royds Garden: Wellington).
- Ruckelshaus, WD., (1985), *Risk, Science and Democracy, Issues in Science & Technology*. Spring.
- Sabatier, P., (1975), Social Movements an Regulatory Agencies: Toward a More Adequate - and Less Pessimistic - Theory of "Clientele Capture", *Policy Sciences*, 6: 301-342.
- Schnurer, H., (1993), *Waste Management in the Federal Republic of Germany - New Policies, Legislation and Consequences in the Common Market of Europe*, paper presented: 10th WWM Nat. Conf. on Waste Management, Perth.
- Stigler, G., (1971), The theory of economic regulation, *Bell Jl. of Economics*, 2: 3-21.
- Stokey, E. & R. Zeckhauser, (1978), *A Primer for Policy Analysis*, (Norton: NY).
- Tietenberg, T., (1988), *Environmental and Natural Resource Economics*, 2nd ed. (Scott, Foresman: Boston).
- Tong, R., (1988), *The differential environmental impacts of packaging in New Zealand*. Unpublished report to the Ministry for the Environment.
- Tong, R., (1989), *Auckland Regional Council Waste Reduction and Recycling Implementation Plan*, (Tong & Associates: Auckland).
- Taranaki Regional Council, (1993), *Regional Policy Statement Waste Management, Background Technical Paper: Recycling*, (TRC: Stratford).
- UNCED, (1992), *Outcomes of the Conference, United Nations Conference on Environment and Development, June 1992, Rio de Janeiro* (MERT & MfE: Wellington)
- Vig, NJ., & ME. Kraft, (eds) (1990), *Environmental Policy in the 1990s: Toward a new Agenda*, (CQ Press: Washington DC).
- Warmer, (1993), Feature: Landfill Mining, *Warmer Bulletin*, 38: 8-9.

Wolf, C., (1979), A Theory of Nonmarket Failure: Framework for Implementation Analysis, *Jl. Law and Economics*, 22: 107-139.

Wolf, C., (1988) *Markets or Governments - Choosing between Imperfect Alternatives*, (MIT: Mass.).