Chapter 13

Building a Recycling Society: The Experience of New Zealand

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CHAPTER 13

Building a Recycling Society: The Experience of New Zealand

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This chapter examines the issues and achievements of policies towards waste and recycling in New Zealand, identifying implications for trade and other countries in Asia. Reducing waste and making better use of materials has a role in the sustainability of economic development, but the characteristics of a country's economy affect the feasibility of recycling materials. A combination of institutional and legal changes has enabled New Zealand to decouple economic growth from waste disposed, but this achievement has depended on export of recovered materials to countries in Asia that are better placed to recycle them. The recycling of materials has implications for security of supply of scarce raw materials as well as for environmental management, and requires international co-operation that enables materials to move to where they can be used most effectively.

Key words: solid waste; recycling; sustainability; government policy

JEL classification: Q53, Q58, O13

1. Introduction

The slow recovery of markets in affluent countries following the 2008 Global Financial Crisis has caused exporting countries to reconsider the sustainability of their method of trade and the growth strategies they had previously followed. Such is the interdependence of countries in today's globalized economy that difficulties in one region are quickly transmitted to other regions, particularly where those regions are heavily engaged in trade. During such times, stimulating domestic demand and trading with a different array of countries may look increasingly appealing.

This chapter examines the role of materials recycling in counteracting the issues raised by the slow-down in economic activity and the long-term issues of the depletion of key minerals and the accumulation of new toxic waste. It analyzes how the current situation has reinforced the significance of sustainable development and investigates the contribution of recycling. It also examines the markets and market failures surrounding the management of material waste. New Zealand is studied in depth to illustrate how the characteristics of the economy affect the feasibility of recycling, as a contribution to sustainability goals. Each country in the East Asian region will have its own particular set of circumstances and solutions to managing waste and recycling, but there are complementary roles between countries and scope for international co-operation in achieving a recycling society that makes the most of the available resources.

1.1. Overview – Towards a More Sustainable Development

A fundamental problem for global development is how to meet the rising aspirations of populations in all countries without unreasonable harm to the environment that they share and their economic livelihoods. Economic growth can put pressure on the environment, such as the atmosphere and oceans and also on the stocks of some key raw materials. New technology that has been developed to reduce the environmental impacts of growth – wind turbines, hybrid vehicles, mobile phones, and rechargeable batteries – are in fact dependent upon particular rare and strategically important minerals. Yet the turnover for these products is so brisk that these materials are appearing rapidly in the waste stream, contributing to a mixture of potentially hazardous substances accumulating in disposal facilities.

The simultaneous creation of growing demands, depletion of key minerals, and the accumulation of toxic waste presents a new combination of risks for continued development in all countries. This is particularly acute in East Asia, which has experienced a recent rapid growth that is based on the very industries at the heart of these new demands. This is not just a waste disposal problem; it is also a resource management challenge (UNEP, 2012). As strategic materials become scarcer and their value increases, it will become increasingly advantageous to mine the waste streams in order to recover those materials. The feasibility, however, of doing so will depend upon the circumstances as to how those products are distributed and recovered, their dispersion across widely spaced markets, and the channels put in place for recovering them after their current uses are completed. The future sustainability of development depends on the evolution of market arrangements, but the existence of market failures and whether domestic policies or international co-operation arrangements can improve the recovery of those materials are all challenges faced by each country in their own distinct ways.

1.2. Why We Need a New Model

The arguments for why the world needs to move towards a more sustainable form of economic development stem from the notion of biophysical limits on the natural environment. World population is growing and it is expected to reach 9 billion by the mid-21st century. Much of that growth will be in countries where a considerable amount of further development needs to be done in order to attain a quality of living that approaches the standard that is enjoyed in more affluent countries. Environmental non-profit organizations, and other commentators, suggest that for these countries to attain a standard of living that is enjoyed in the USA, would create a resource demand so large that it would require another planet to accommodate them. Such "forecasts" are designed to alarm and tend to ignore the effects of change in technologies and public demand over time, but they have a point. A world with 9 billion people will be different from a world with 6 billion and it will create very different demands upon the Earth's resources than have hitherto been experienced. It will also be increasingly important to achieve efficiency in natural resource use.

The modern notion of sustainable development first came to prominence in the "Brundtland definition" at the 1987 World Commission on Environment and Development. It was enthusiastically adopted by governments and subsequent international gatherings, including the 1992 Earth Summit in Rio de Janeiro and the 2002 World Summit on Sustainable Development in Johannesburg. Countries, however, have differed over how to implement it. The Organization for Economic Co-operation and Development (OECD) (2001) reduced it to merely dealing with externalities and properly accounting for natural resources as part of the capital to be considered in pursuing growth in incomes and wealth.

Practical measures that should favor sustainability include removing subsidies that exacerbate environmental damage (e.g., on fossil fuels), extending payment for environmental services that are currently free (e.g., water abstraction and discharges), and generally raising the efficiency by which resources are used. These measures would also be in the economic prescriptions for allocative and dynamic efficiency in resource use, which has led to the suggestion that sustainability can be viewed in conventional economic terms, such as "dynamic efficiency plus intergenerational equity" (Stavins, *et al*., 2002).

The Global Financial Crisis has led governments to review their commitment to sustainable development programs based on affordability, but the underlying conditions have not changed. The crisis has reinforced the desirability of sustainable development. Financial constraints have increased the importance of value for money from investments, efficiency in resource use and taking into account the trade-offs between short-term gains and long-term effects.

1.3. Material Recycling and Sustainability

If resource use efficiency is an underlying motivation for sustainable development, then making the most of available resources should create a role for finding better ways of dealing with waste and getting more from materials by recycling them. Both developed and rapidly developing countries have adopted the 3R principle (Reduce, Reuse, and Recycle) to materials, but economic factors drive countries to implement them in different ways. Higher income countries have the capability to apply sophisticated technologies to the sorting and recycling of waste,

but high labor costs have also led them to export their wastes to be treated in other countries, where labor costs are lower. If those countries have less labor and environmental regulation or weaker enforcement, then practices can emerge that increase the potential risks to human health through serious pollution of air, soil, or water.

In order to create a common understanding of the 3R policy approach, ERIA has established a Working Group to examine the conditions of such policies in East Asian countries, with the aim of developing recommendations for promoting 3R as an industrial policy and creating a sustainable recycling society in the region (Prakash, 2011). While the principles may be the same, each country will apply them differently according to their own national characteristics, creating the likelihood of different and complementary roles for each country across the region.

From an economic perspective, material waste is simply material no longer of value in its current form, which its owner would willingly discard (Productivity Commission, 2006). This definition excludes substances that are reused or sold by the organizations that own them, but includes those of no value to their current owners, which may yet be valuable to others (e.g., recyclable materials).

Private businesses have commercial incentives for avoiding waste, but there is a limit to its value when acquiring new materials and discarding old materials are low cost options. Whether waste is reused, recycled, or disposed of in a landfill depends upon which option is most beneficial or least costly to the owner. The consideration of waste management and policy centers on the choices, incentives, and influences at the site where the materials are discarded. Ensuring the discard decisions of private individuals and businesses are beneficial to the community at large and properly reflect externalities is a justifiable issue for public policy to address.

Market failures distort the choices made in the materials use cycle and affect the relative level of disposal and recycling. Removing price distortions over the choices for waste discarding has had two effects: increasing the “frugality” amongst waste generators, and improving the viability of reuse and recycling activities. The critical questions for waste management policy are what is the extent of price distortion, the over-production of waste, and what are the most cost effective means of reducing that distortion?

Waste is perceived to be a problem for various reasons. There is the risk of waste accumulation harming the environment and human health, and the perceived scarcity of space for landfills, which increases the difficulty and cost involved in locating landfills accessible to sources of waste. There are concerns over the availability and conservation of raw materials; and some have a moral distaste at what they regard as "wasteful" over-consumption.

The contamination of water supplies, greenhouse gas enhancing landfill emissions, neighborhood nuisance effects such as smells, noise, and the attraction of vermin, are all externality effects that affect third parties and will be over-supplied if they are not adequately reflected in the price of waste services. Identifying the nature of externalities associated with waste and the extent to which the market fails to reflect them in the price of discard options is a fundamental step in an economically efficient waste policy.

Apart from market failures, it is also useful to think of waste management and recycling as part of security issues. These issues include: security of materials supply in the recoverability of scarce materials at a lower cost than the virgin supply; environmental security from reducing the risk of damage to the environment and human health; and security of economic progress and alleviation or some of the variability from unsustainable growth.

The economic approach to security is to maximize the net benefits from activities by finding where marginal benefit equals its marginal cost. In the context of waste and recycling, this would involve finding the level of waste reduction, or "abatement" activity, that minimizes the combined cost of abatement activities and the expected possible harm that arises from increasing waste. This, however, is difficult in a world of incomplete information and competing interests for resources and policy attention, but it remains a useful reminder of the possibility that in some situations there may be too much recycling rather than too little.

For most materials, the optimal level of waste is unlikely to be zero waste, because marginal abatement costs rise with successively higher levels of waste abatement. Recovering materials from the community is relatively easy and low cost when materials are concentrated and clean. When they are dispersed and contaminated in use, reuse incurs higher transport and processing costs. While some

materials are so valuable, or so hazardous, as to warrant incurring a higher cost to recover them, for waste materials in general, the optimal and economically efficient level of waste is not zero waste.

Such economic prescriptions can incorporate the environmental and social dimensions of sustainable development in the way that the effects are included and valued in the analysis. Aligning the incentives of private choices with community wide benefits requires identifying significant consequences of waste outside of private considerations that policy needs to address (i.e., market failures and externalities) and what policy measures are most effective and efficient in so doing.

1.4. Policy Approaches to Waste Management

A wide range of measures have been proposed and applied in waste management policy in different countries and there is substantial overseas experience to inform policy development. As the externalities of waste and the economics of proposed solutions to them, vary widely with local conditions, reproducing measures applied in one country may not be efficient for use in other countries.

Generally policy approaches can be divided between "soft" and "hard" measures.

Soft measures include "moral suasion" through education and information campaigns to shift society's behavioural norms towards voluntary restraint of wastes; and self-regulation and co-management, such as industry groups that jointly agree to reduce wastes amongst their members. Harder measures include regulation and prescriptive direction of various kinds, such as regulation to effect price adjustments, regulation to set performance standards and quantity controls; and regulation to change the structure of suppliers and regulators. Market adjustment through taxes and subsidies, of which there are numerous international examples for waste policy, and market creation devices like tradable permits or quotas are particular types of regulation that use market-like instruments to change incentives. Hardest of all is direct public involvement in supplying services through ownership or partnerships with private entities.

The application of waste instruments does not always have economic efficiency as its primary concern. For example, taxes and levies on disposed waste have long

been used in Australia and Scandinavian countries, but their rates have been primarily set to raise revenue or achieve waste diversion targets and they bear little relation to the price that would be needed to efficiently reflect the full cost of externalities. Physical waste reduction targets are widely used, but with little demonstrable link to efficiency or community well-being. The targets have become an end unto themselves, rather than a means to the end of optimal waste management.

Such approaches will often be implemented in stages and adapted as conditions evolve. Hezri (2009) has identified five separate stages in the development of waste management in Japan with a distinct focus on each one. These stages include:

- public health and sanitation with the establishment of infrastructure and municipal responsibility for the collection and disposal of waste;
- environmental safety and the phasing out of uncontrolled disposal and the establishment of applied standards to waste treatment;
- waste minimization with public acceptance and adherence to the principles of reduce, reuse, and recycle;
- integrated resource recovery with the development of industrial scale capabilities for resource recovery and material recycling; and
- extracting the benefits for climate mitigation with energy recovery from waste to reduce emissions and displace alternative energy.

Hotta (2009) has also identified the need for a consistently high level of regulatory capabilities on the part of municipal authorities and the need for capacity building in local and central government for implementing waste and recycling policies. Rather than reinventing the wheel, international co-operation and development of common standards should supplement capacities in local agencies across countries and improve the efficiency of region-wide resource utilization.

Similar stages and challenges have been faced in other countries and they provide a useful framework in which to consider the evolution of policies. Nevertheless, their form can be quite different, as is shown by the example of New Zealand.

2. Building a Recycling Society: Issues and Challenges for New Zealand

New Zealand may not be typical of Asian countries, but it is still informative of the influences of waste and the recycling activity. It is a small country on the edge of the Pacific Rim with a mountainous topography and a temperate climate that is good for growing produce and converting grass to animal products. It has a strong primary production sector with respect to dairy products, meat, horticulture and fish, and other primary-based sectors, such as forest products and minerals. As an OECD member, it is accustomed to the environmental sensibilities of other affluent markets and its tourism industry attracts visitors from afar to experience its natural scenery. It is, therefore, a country that trades on its reputation for good environmental credentials.

Although it exports primary produce, its geographical location, remote from the major markets, means it must overcome the drawback of distance in order to access these markets. Transport costs, both to other countries and between regions in New Zealand, are significant concerns for exporters and a stimulus for seeking efficiencies in production. This has had a major impact on the pattern of recycling activity in New Zealand.

2.1. New Zealand and Sustainability

In New Zealand, the spirit of sustainable development found early expression in the Resource Management Act of 1991. The purpose of this Act was the sustainable management of natural and physical resources. This is not the same as sustainable development, as the Act is primarily concerned with managing the adverse effects on the environment rather than achieving socio-economic outcomes, but it defines environment to include people and communities. Sustainable development was also introduced through various central and local government initiatives. In particular, councils adopted the principles of Agenda 21 that followed from the 1992 Earth Summit in Rio, but it was not until 2003 that the New Zealand government formally launched a Sustainable Development Program of Action.

This gave effect to sustainable development by selecting four broad areas for programs of action – quality and allocation of freshwater, energy, sustainable cities, and investing in child and youth development. Other government initiatives, such as the Waste Strategy in 2002 and the Energy Efficiency and Conservation Strategy in 2001, were clearly inspired by sustainability but were not central to this program.

Internationally, governments agreed to prepare national sustainable development strategies at the Rio Earth Summit in 1992 but of the 30 OECD member countries, only 23 had prepared formal strategies by 2006 (OECD, 2006). New Zealand was not an early adopter or leader in its approach to sustainable development. Its Program of Action was both relatively late and negligible on measurable outcomes or targets and it spread responsibilities so extensively across the government sector that there was limited oversight. With a change of government in 2008, many parts of the program were revised and while work in these areas continues, it has been "rebranded" with less emphasis on sustainable development.

2.2. Emergence of Material Waste Issues

The management of waste has long been a function of local government in New Zealand. The Health Act in 1956 placed responsibility on local municipalities and rural county councils to provide for sanitary waste collection and management. Many councils took it upon themselves to provide waste collection and disposal facilities, although the law did not require them to do so. Hundreds of landfills were established across the country and many were small with minimal management standards.

By the 1970s and 80s, public concern began to escalate over waste management. Some of these concerns resulted from the increase of littering in an affluent society and some recognized a new awareness of waste management issues in other English-speaking countries, as well as the emergence of the 3R principles of reduce, reuse, and recycle. There was also a period of upheaval in economic perspectives. When the influence of Reaganomics in the USA and the Thatcherite reforms in the UK impacted New Zealand, it led to a more stringent assessment of the role of public spending and the extent to which it could be justified by market failures. This set the scene for local government reformation and environmental protection, along with

planning laws that would influence the future of waste management from the 1990s onwards.

Despite its traditionally large local government presence, waste management has also had increasing involvement of the private sector, both as contractors providing council-funded services and recently as providers of collection and landfill disposal, servicing industry and residential customers directly. The New Zealand waste management industry is commonly divided into different functional components; waste collection and delivery, including sorting for recycling; transfer stations for aggregating small loads; and waste disposal in landfills or incineration. Incineration is not used in New Zealand apart from low volume medical waste and small-scale incinerators attached to schools and other public institutions are being phased out to meet the rising standards for air quality. Some building and construction waste consists of inert material that can be buried in "clean-fills", which require less stringent management standards than mixed waste landfills. These separate functions of collection, sorting, transfer, and disposal often overlap within individual organizations and there is little official information distinguishing the entities engaged in the different functions.

Collection is a competitive business with relatively easy entry, since it has low capital requirements. Landfill establishment and operation involves higher capital requirements, making it more likely that incumbent operations will dominate the local markets. Many old landfills are council operated, but private companies are increasingly involved in the development and operation of new landfills. This private involvement infused new capital and expertise into the activity and brought economies through scale of operation and, in some instances, vertical integration with collection operations.

The recycling industry in New Zealand is diverse, difficult to quantify, and reveals varying characteristics according to materials collected. There is a strong unassisted private sector involved in the recycling of metals, paper, and glass. All these materials can be used as feedstock for large vertically integrated industries that are located in New Zealand. Plastic recycling has a more variable record with no dominant local producers and most recovered materials are destined for export, because very little recycled plastic can be used in food or medical packaging.

Recycling plastics in New Zealand tends to gravitate towards lower value uses, such as housewares and garden equipment. Export markets provide benchmark prices for most materials and are the primary destinations for materials collected in the South Island, because internal transport costs to North Island recycling plants are too high.

A number of local councils support recycling schemes, concentrating on post-consumer waste in which materials for collection are dispersed, low volume, and often contaminated with mixed materials. Much of their emphasis has been on extending the curbside collection of recyclable material at a lower cost than collection for disposal. Some councils assist non-profit organizations with facilities. Most commercial interest is in recycling industrial waste, which yields volumes that are larger, less dispersed, and not as likely to be contaminated. A recent development is the emergence of large scale recycling of green-waste for compost, often involving co-operation between councils diverting waste from their landfills and the production and marketing of compost by commercial concerns. These are particularly successful in main urban centers supplying a large demand from household gardening.

The principal incentives for recycling are market prices for recovered materials, the public relations benefit for demonstrating environmental credentials, and the reduction in costs of landfill depletion. Obstacles to recycling include high transport costs for what are often low value high volume materials and distorted incentives, which are caused by landfill charges set at less than full cost. There are also the inconsistencies of councils holding waste minimization objectives, while encouraging increases in disposal volumes to increase cost recovery from their landfills.

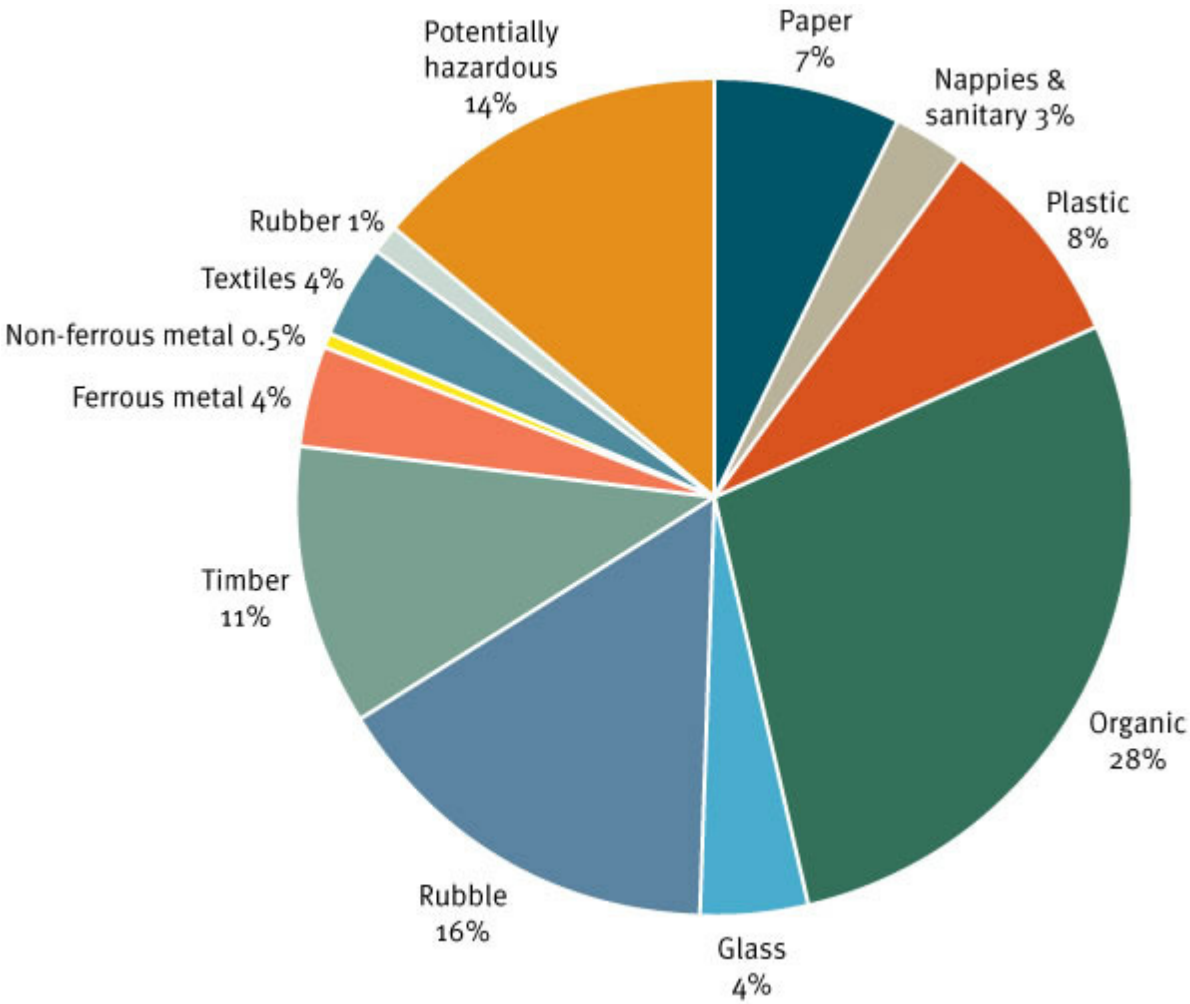
There are market failures in waste management that recycling could potentially rectify, thus creating a role for recycling in the economy. There could also be market failures that hinder the emergence of recycling options themselves. Such market failures include the conventionally defined externalities of activities that impact the environment. Other market failures act primarily on the economy and determine its structure and composition, such as the existence of monopolies, limited competition, and limited contestability in the material use cycle.

Specific market failures, with respect to recycling, that were identified in New Zealand before recent reforms include: waste collection and disposal financed through general (local council) taxation, which distorts the price of disposal (Pearce and Turner, 1993); instances when consumers are charged for disposal that may not reflect the full social cost of disposal (e.g., if landfill fees exclude significant external environmental costs of disposal); and instances when the price of virgin materials does not reflect the environmental damage that occurs in its production but not in recycled material. Therefore, market choices will be biased against recycling (Tietenberg, 1988).

The Ministry for the Environment (2012) estimates that around 8.7 million tons of solid waste (from domestic, commercial, industrial, and institutional waste sources) were generated in New Zealand in 2006, of which 2.4 million tons were subsequently diverted from landfills. This means that approximately 6.3 million tons of waste were sent to landfill and clean-fill sites that year. When averaged across the total population that represents 1,572 kilograms of solid waste per person, per year. Just over half of this figure comprised inert material, like building rubble that can be cheaply disposed of in clean-fill sites.

Waste composition proportions in landfills for national indicator sites in 2007-08 are shown in Figure 1 below.

Figure 1: Composition of New Zealand's Disposed Wastes in 2007-2008



Source: Ministry for the Environment, 2012

Major items by volume are organic waste, rubble, and potentially hazardous waste, which may include e-waste (electronic waste). There are cost saving advantages in diverting large volume materials away from landfills. For instance converting organic waste to compost to sell to home gardeners or diverting inert materials to clean-fills.

As an economy with an important agricultural sector, concerns have emerged about waste management in the rural sector, where localized contamination can occur around old timber processing sites or farm chemical stores. Poor management of on-farm disposal practices can result in a number of risks to people and the

environment. Off-farm waste management can also entail risks to people and the environment if waste plastics are not properly rinsed or cleaned.

A proposal for a commercial scale incineration plant in a rural area was abandoned in the early 2000s, partly because of concerns about perceptions of contamination of surrounding rural produce. Surveys suggest that among individual farmers, on-farm burning is the most frequently used option for managing waste farm plastics, having lower private costs per ton compared to alternatives. Such private cost takes no account of the resulting load of uncontrolled discharges. On-farm burial has an even higher private cost per ton, so avoiding the discharges of on-farm burning implies finding less costly off-farm options. The primary off-farm choice is between disposal in landfills and recycling, but the economics are highly dependent on location, transport costs, and the value of recovered material in the recycling option. The recycling of farm plastics struggles to cover its full resource input costs without external support of some kind, but there are schemes in operation that rely on farmers' returning empty containers to assembly points on their trips into town, which gather sufficient volumes for on-selling.

2.3. Changes to Waste Policy

New Zealand's waste policy has evolved through both non-statutory measures and legislative changes over the past two decades. These measures include:

- local government reorganisation in 1989, which increased the capabilities of councils through amalgamation into larger jurisdictions and created a two-tier system of local government. Regional councils set resource policy over broad areas and local territorial councils for cities. Smaller urban and rural districts provided local collective services, such as roads, waste collection, and parks;
- requirements for resource use consents (permits) and national environmental standards brought in under the Resource Management Act (1991), which prompted improved management practices at landfills and other waste facilities and led to the closure of many smaller older landfills with lower performance standards;.
- amendments to local government legislation, which required local councils to produce waste management plans and encouraged councils to become more involved in waste management and recycling;

- non-statutory guidance from the Ministry for the Environment, such as landfill full costing and best practice management, which has helped spread the adoption of cost reflective pricing and removed some of the distortions in council-run waste management services;
- voluntary producer responsibility schemes, such as the Packaging Accord (2004) between government and industry and other take-back schemes for batteries, car tires, and paints. This has reduced the volume of such materials going to landfill; and
- the Emissions Trading Scheme that applied to landfills after 2010. This gave incentive to operators to monitor and manage their greenhouse gas emissions and in some cases encouraged the use of collected methane to generate electricity to sell on the local power system.

In 2002 the government launched the non-statutory New Zealand Waste Strategy with a vision of "zero waste and a sustainable New Zealand", setting 30 targets across 9 areas of priority. In 2007, the Ministry for the Environment reported variable progress on these targets, but the strategy has been revised and continues to influence government activities in this area.

Waste management remained one of the priorities of the new government elected in 2008, even after the financial crisis slowed the pursuit of sustainability. The culmination of ten years of policy was the Waste Minimization Act of 2008. It aimed to reduce the amount of waste generated and disposed of in New Zealand and to lessen the environmental harm of waste. It also aimed to benefit the economy by encouraging better use of materials throughout the product's life cycle and by providing greater employment through local waste recovery and reprocessing. The Act imposed a levy from July 2009 on all waste disposed of in landfills in order to generate funding to assist waste reduction initiatives by local government, community organizations, and businesses. It also had provisions for helping and (when necessary) making producers, brand owners, importers, retailers, and other parties take responsibility for the environmental effects of their products through product stewardship schemes. It also allowed for regulations to be made making it mandatory for certain groups (for example, landfill operators) to report on waste to improve the information on waste minimization.

For several years before being implemented in the 2008 Act, a levy on waste deposited had been considered, with discussion on whether it should be designed primarily to charge for externalities or simply to raise revenue for supporting other waste management purposes. A single instrument cannot effectively serve both pricing and revenue aims. An externality tax will only change behavior if it is designed for particular externality effects and is large enough for consumers to notice, whereas a revenue raising tax is best spread wide and at a low level to minimize consumers' adverse response. Despite concerns that the levy would be inefficient and incur high administration costs relative to the revenue sought and that it could encourage switching to products that avoid the levy (i.e., paper packaging), the Act provides for a revenue raising levy that bears no relation to the externalities of waste or the quality of their management. In its second year of operation, a report from the Ministry for the Environment found the levy to be operating satisfactorily, although a detailed examination of the costs of its operation and its effect on industries dealing with waste has yet to be undertaken (MfE, 2011).

2.4. Effects of Policy Changes

In the past there have been demonstrable externalities in New Zealand from a relatively unregulated waste industry. These have included the contamination of surface waters and aquifers from leachates seeping from old unlined landfills; the risk of on-site fires, explosions, and toxic emissions from mixed wastes in landfills; the effects of neighborhood nuisance, such as noise, odours, and the attraction of pests and vermin to landfills; and the global effect of emissions from landfills of methane, a potent greenhouse gas.

However, since the 1991 Resource Management Act, tighter consenting requirements have increased the standards achieved by landfills and closed many facilities that could not meet the standards at a reasonable cost. The number of landfills operating in New Zealand dropped from 327 in 1995 to 54 in 2010. Price distortions have also been reduced as councils have moved to "pay per bag" charging rather than the funding of household collections from local property tax (rates). Disposal fees now reflect the full cost of landfills and there is a greater involvement

of specialist private waste management companies that bring commercial disciplines to their operations.

The disposal of waste in landfills in New Zealand has slowed recently and volumes disposed decreased by 29% per unit of economic activity between 1995 and 2006 (MfE, 2007). Existing policies were already decoupling economic growth from waste generation before the 2008 Act was implemented. The reduction in landfill disposal as incomes rise has continued throughout the financial crisis. This may reflect waste being diverted for disposal in clean-fills or other unrecorded sites, as the waste levy applies to landfills only, but there is no reliable evidence on this.

Table 1 shows the changes in landfill disposal since the mid-1990s and relates this to changes in population and income. The number of registered sites for disposal has reduced substantially as smaller and less well managed landfills have either reached the end of their useful lives, or have failed to obtain consent to continue operating. The tonnage disposed of has also reduced, contrary to the rise in population and income. Compared against a dollar of GDP in both aggregate and per capita terms, tonnage disposed has been declining. There is some ambiguity about by how much, because data on landfill disposals and diversion of waste to recycling are patchy, dependent on periodic surveys or censuses of landfill operations. The imposition of a waste levy since 2009 has improved data collection and will build a more reliable series in future.

Table 1: Waste Disposals to Landfills over Time

	Population	GDP	GDP	Disposal	Disposed	Source
	m	NZ$m	US$m	Sites	Tonnes	
1995	3,707	93.564	61.417	327	3.182.120	State of Environment Report 1997
1999	3,833	104.109	55.133	221	2.765.020	Landfill Census 1998-1999
2002	3,936	116.464	54.058	115	3.022.000	Landfill Census 2002
2005	4,127	130.874	92.187	95	2.767.400	Extrapolation from Canterbury Data
2010	4,362	134.654	97.156	54	2.532.007	Ministry for the Environment

Note: GDP estimated in constant 1995/96 dollar terms
Source: NZIER

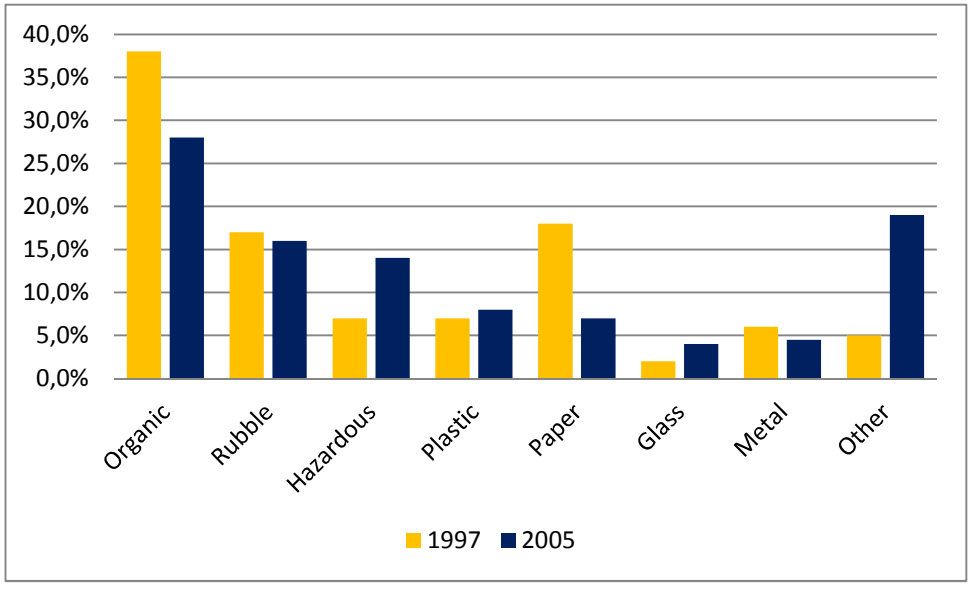
As landfills become fewer in number and subject to higher management standards and full cost pricing, the risk of externalities from them harming the surrounding environment becomes lower. Compared to many other countries, New Zealand has no lack of landfills or the space for new ones and economic

considerations suggest a different mix of material disposal and recycling would be optimal in New Zealand, more so than that found in more land-constrained countries.

Limited information exists on the quantities (either volume or weight) of items recovered for resale. The Ministry for the Environment's *Environment New Zealand 2007* reported that in 2005 2.4 million tonnes were being diverted from landfills to recycling. Of this total, 14% was from municipal waste streams and the rest was from commercial business discards. About half of that volume was clean-fill material, which would mean that the proportion of material diverted to recycling would be the equivalent of about 40% of the volume actually disposed in landfills that year.

Nevertheless, there are signs of positive moves towards reducing the volumes being disposed of in landfills. Apart from the reduction in volumes, Figure 2 summarizes the figures from the Ministry for the Environment showing changes in composition of wastes disposed of between 1997 and 2005. This shows a marked reduction in the shares of big volume items like organic wastes and paper. The increase in the share of hazardous waste may be attributable to better recording of these materials.

Figure 2: Change in Landfill Waste Disposal over Time

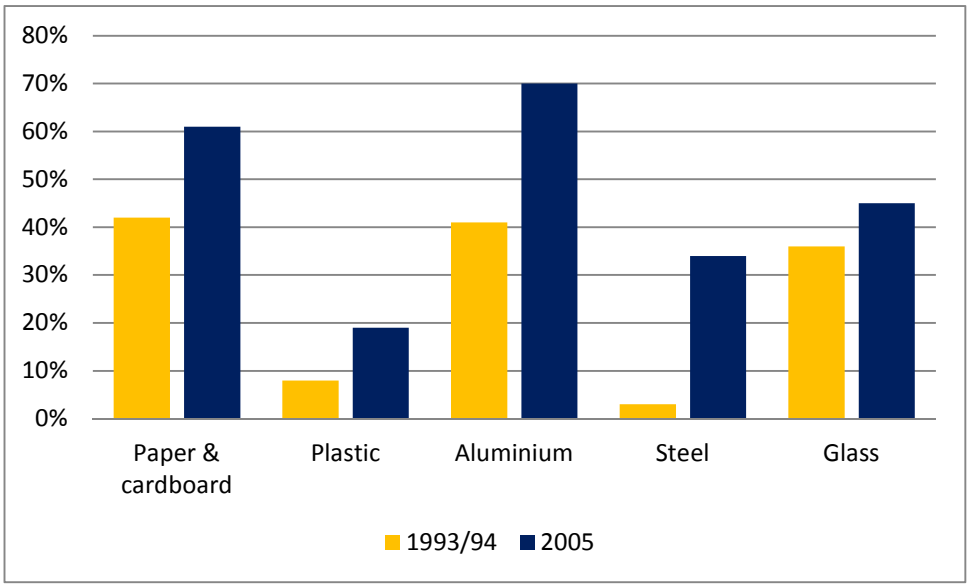


Source: Ministry for the Environment 2009a.

Information on changes in recycling activity is also incomplete. However, Figure 3 summarizes the figures from the Ministry for the Environment and the New

Zealand Packaging Council and shows that recycled volumes of the main material categories have increased as a share of each material's total use for packaging over a 10-year period (Goddard, 2006).

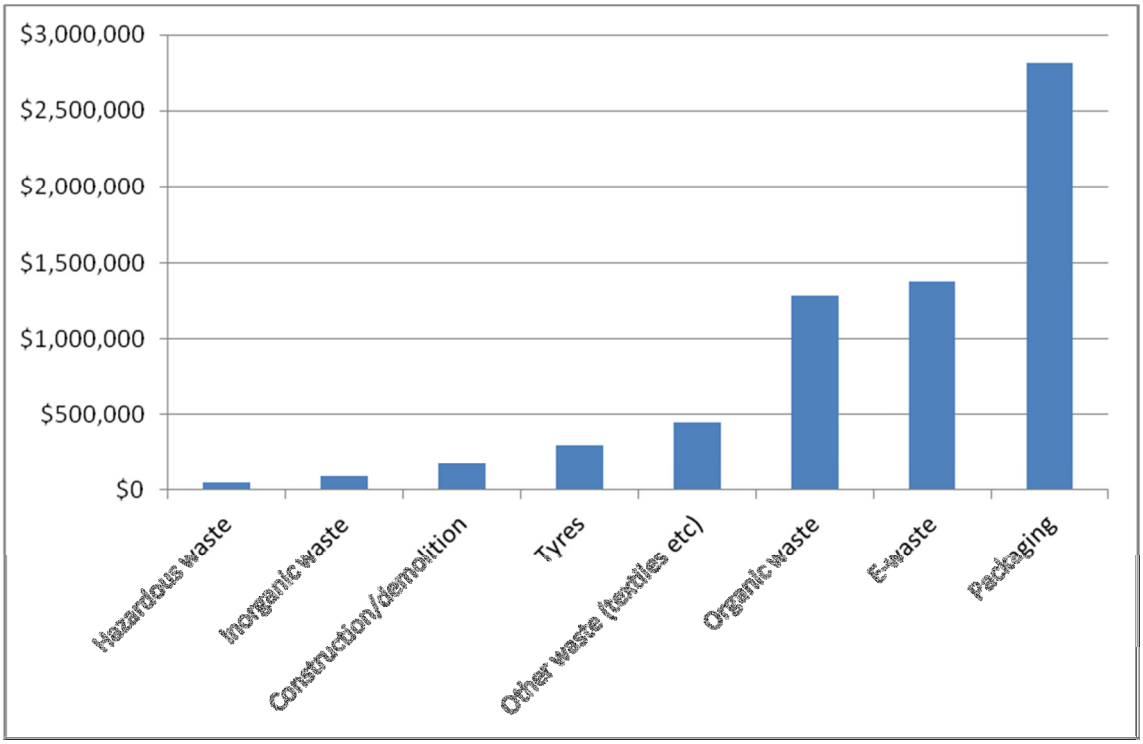
Figure 3: Change in Recycling of Packaging Materials over Time



Source: Ministry for the Environment 2009a.

The waste levy provides revenue which is split between local authorities and a Waste Minimisation Fund set up to support waste and recycling initiatives by private and non-profit organisations. Figure 4 shows the distribution of grants from that fund in 2010, the first full year of its operation. The first round of the Waste Minimisation Fund grants allocated $6,536,641 to 25 projects and attracted a further $6.5 million (approximately) contributed by project partners (MfE 2011). The largest shares went to packaging, e-waste and organic wastes.

Figure 4: Levy Funded Grants to Recycling Activities



Source: Ministry for the Environment 2011

2.5. Obstacles to More Recycling

The characteristics of New Zealand present particular challenges for the viability of recycling materials. Population density is low and waste dispersed over large areas of the country increases the cost of material collection and limits the realization of economies outside of the main cities. Because of the size and concentrated structure of industries in New Zealand, for many materials there is only one plant capable of using substantial recovered material. Processing stations are generally located at one end of the country rather than centrally. The North Island city of Auckland is the center for glass, paper, and steel; while Bluff, which is located in the southernmost South Island, is for aluminum.

New Zealand is elongated and internal transport costs are high, but the alternative of exporting recovered materials is subject to fluctuating commodity prices and exchange rates. Recycling operations may be faced with periodic price downturns and a choice must be made of bearing operational losses, storing material

until prices improve, or disposing of it at landfill, which does not look good with the publicity material that has been collected for recycling with the council's assistance.

Waste policies have increased the volume of recycling in New Zealand, but this now exceeds the capability to reprocess the material within New Zealand and the recycling industry has depended on the export of materials to China and other Asian countries. Since the global financial crisis gathered pace in 2008, the demand for such materials on the international market has weakened, leaving many recycling schemes facing reduced revenues. Council-backed free curbside collection for recycling or storing materials for which there are no current viable market outlets are coming under increasing scrutiny as councils respond to financial stringency.

New Zealand's approach to waste management has depended on voluntary commitment to measures that restrain the production of waste and its disposal. The Waste Management Act has provisions for more compulsory measures, but has yet to utilize them other than the waste levy. There are practical and economically justifiable reasons why landfill tax, product charges, and subsidy schemes have been passed over in favour of voluntary approaches to promote waste minimization and recycling. Making such measures mandatory would incur transaction costs in implementation and geographical variability increases the likelihood that uniform national measures would create inefficient distortions and cross-subsidies between locations around the country. However, that may change and more compulsory measures, like product stewardship schemes based on extended producer responsibility may arise given co-operation of the overseas suppliers of particular products.

2.6. The Case of e-Waste

E–waste, or waste electronic appliances such as televisions, mobile phones, computers, digital cameras, and other consumer electronic items, is viewed as an increasing problem in New Zealand. This is predominately because consumers and local authorities are in doubt as to how to dispose of them. Electronic products have a short effective life span and are turned over within a few years as new models supersede older ones. Technological advances and marketing trends encourage consumers to frequently replace equipment even while it is still in good working

order. Other changes, such as the impending switch from analogue to digital television broadcasting in New Zealand in 2012, also render equipment obsolete and destined for the e-waste stream.

International experience suggests that a large volume of e-waste consists of household appliances and "white-ware", such as household refrigerators, washing machines, and dishwashers. This, however, does not appear to be the case in New Zealand where the market for white-ware products is dominated by a single domestic manufacturer accounting for nearly 50% of sales. This domestic manufacturer and a major import competitor, run take-back schemes through their distributors and the industry deems that up to 95% of these white-ware products are being recycled (MfE, 2006). These items are comprised mostly of steel, which has low value yet is readily recyclable, but they also contain non-ferrous metals with higher monetary value. The recovery of refrigerant materials such as CFCs and HCFCs is made more valuable under the terms of New Zealand's emissions trading scheme for greenhouse gases. With what amounts to a voluntary Product Stewardship commitment, the white-ware companies have adopted "Design for Environment" principles to avoid waste production and aid material recovery. These companies assert that the take-back schemes facilitate their domestic sales and improve turnover of the national appliance stock, along with the removal of older less efficient appliances from circulation.

The majority of other types of old appliances in New Zealand are disposed of in landfills without any attempt to recover the toxic and sometimes valuable materials within them. There is believed to be a large quantity of obsolete electronic equipment held in private premises by people who have upgraded their appliances, but are reluctant to dispose of the old models in landfills as they regard this as an irresponsible disposal option.

Periodically suppliers of such equipment will offer trade-in deals, taking back old equipment for a discount on new models, but this is by no means a universal practice. In recent years a charitable trust has organised "eDay" collections of such equipment in the main cities across New Zealand, when private individuals can deliver their e-waste to a collection point. The trust is able to sort and recover some materials for local recycling or arrange for the export or responsible disposal of the

remainder. Another charitable foundation raises funds for child health services by collecting old mobile phones and sending some to Hong Kong for reconditioning and resale and others to a local recycler to recover the metals.

But there are costs of e-waste that are currently hidden and "off-budget" from the viewpoint of the waste industry, local authorities, and non-profit bodies involved in their recycling. These are borne across the community, by the volunteers who give up spare time on work associated with eDay activities, by those who store e-waste while seeking a responsible disposal option, and by the community at large facing the risk of environmental and health costs associated with their disposal in landfills.

The risk of contamination from landfilling e-waste is low, yet a preference for responsible disposal persists. New Zealanders seem less willing to pay for it to be removed than they are to put up with storing old e-waste and taking the time to deliver it on eDay. However, the characteristics of e-waste create obstacles to commercial recovery in New Zealand. There is not a uniform or concentrated market for electronic appliances and the diversity of products makes it difficult to achieve economies of scale in disassembling products to extract small quantities of valuable materials. The diversity of suppliers also creates a risk of free-riding on collective industry initiatives to recover and accumulate materials into exportable quantities (EDay NZ Trust, 2011).

Within New Zealand, those involved in e-waste favor a product stewardship scheme that takes responsibility for recovering e-waste, but this has not yet been implemented. Product stewardship is about product suppliers understanding, controlling, and communicating a product's environmental health and safety issues and the related effects through its life cycle, from production to final disposal or reuse. Under the Waste Minimization Act, five accredited product stewardship schemes exist for waste oil, farm plastics (two schemes), refrigerants, and glass. Similar voluntary schemes exist for selected suppliers of computer equipment and vehicle batteries and two of the main mobile phone service providers also have take-back schemes. However, voluntary product stewardship schemes for e-waste are susceptible to free-riding possibilities, thus raising questions over whether such schemes would require compulsion. If so, the industry would prefer a co-regulatory structure overseeing the scheme, in which government and industry co-operate in

setting and enforcing the rules, but in a sector of such diverse players, agreement on such an arrangement has yet to emerge.

Gathering sufficient volume to cover collection costs and transport to larger manufacturing centers is a constraint on the handling of e-waste in New Zealand. Smaller nations have limited recycling capabilities and are typically limited to the disassembly and separation of major components, such as plastics, metals, and circuit boards. Countries with a large manufacturing base have in-country recycling facilities capable of extracting valuable materials for reuse. There are complementary roles between countries in the recovery and reuse of electronic materials.

There is a growing reluctance among developing countries to be seen as a dumping ground for e-waste from richer countries and as incomes rise in these countries low labor costs will become less of an advantage for disassembly and material recovery. Restricting trade in such materials can also represent lost opportunities for recovering materials that are becoming scarcer. For countries like New Zealand, where conditions of remoteness and high labor costs are not favorable for high volume recovery of such materials, there is a risk that the materials embedded in these products will get locked into a one-way flow to disposal because of obstacles to effectively recover and recycle them. Economic factors push to such an outcome, but could be compounded by regulatory or administrative arrangements adding further obstacles to trade in waste materials.

Countries with a comparative advantage in recovering e-waste may miss an opportunity for securing materials and employment if they are not open to receiving it. Avoiding this may require international agreement on the standards for e-waste that would be acceptable for trade. It would also be assisted by the companies that manufacture products that quickly become e-waste, putting more effort into designing products that can be easily up-graded or disassembled and making provision for recovering the materials through stewardship undertakings.

2.7. Further Moves on Waste and Rrecycling

Waste management policy in New Zealand has achieved much over the past decade, but further extensions for sustainability purposes are questionable. Its

achievements include improvement in the access to and use of recycling services; more stringent application of regulatory requirements; the rationalization of waste management facilities; increased uptake of best practice guidelines for managing disposal facilities; and the strengthened regulatory framework of the Waste Minimization Act 2008 (MfE, 2010). Nevertheless, the Waste Minimization Act's levy on waste disposed in landfills bears no relation to measurable externalities coming from landfills, most of which are now relatively new and managed to high standards. As a revenue raising device the levy is inefficient, as it collects off a narrow tax base. Pursuing targets for waste minimization and maximizing material recovery, reuse, and recycling without explicit consideration of the costs and benefits will itself be wasteful of non-material resources, such as labor, energy, and capital diverting them from other activities of value to the community.

Despite these improvements, waste management policy formulation continues with a direct but narrow interest in waste management. The Ministry for the Environment's "*Environment New Zealand* 2007" report states explicitly that, "the development of the New Zealand Waste Strategy and its targets illustrates a shifting focus away from controlling effects of waste disposal towards minimizing the amount of waste requiring disposal and increasing how efficiently valuable resources are used" (p.140). In other words, waste policy is no longer guided by the "effects basis" of the Resource Management Act, but minimizing waste is an end in itself. The language of waste minimization and the slogan "towards zero waste" may have resonance in social marketing, but in economic terms is a costly and practically unachievable goal due to diminishing marginal returns from waste abatement.

There is a risk that popular conceptions of waste reflect an outmoded picture of past waste problems, rather than the current situation and are an unreliable guide for policy direction. In a public discussion document on waste minimization (MfE 2009b), the Ministry for the Environment cited an *Environmental Performance Review of New Zealand* by the OECD (2007), which noted that household waste sent to landfills roughly tracked gross domestic product and it saw little sign that waste would not track GDP in future (MfE, 2009b). Yet in the same paragraph the Ministry noted that between 1995 and 2006 the weight of solid waste disposed in landfills had increased by 14% (similar to population growth), whereas real GDP had

increased by 40%, suggesting some decoupling of waste from economic growth was already occurring. When the government revised its Waste Strategy in 2010 (MfE, 2010), it identified its "zero waste vision" of the 2002 Strategy as having too many targets that were unable to be measured or achieved. Its revisions sought a simpler more flexible approach through two high level goals, reducing the harm caused by wastes and improving the efficiency of resource use.

Concerning recycling, the existing statistics make it difficult to isolate this activity from the wider functions of the manufacturing and distribution industries. In respect to commodities (metals, paper, plastic, and glass), the potential for additional employment is likely to be restricted mainly to an increase in collection and sorting activities. That is, the introduction of curbside recycling collections and drop-off facilities in those parts of the country where they do not already exist and sorting of the collected materials. However, these require local government funding.

Local governments support curbside collection as it is popular with constituents and provides residents with the "warm glow" of discarding their waste responsibly, but it results in a predominance of high volume low value commodity materials in most recycling operations. Markets for recovered material are limited and generally require high transport costs to reprocessing points or export ports. They are also prone to international price volatility. Those employed in the collection, sorting, and recycling are generally low skilled or unskilled, labor.

Some in the recycling industry claim there is limited capital available to develop the recycling industry, but this may simply reflect the lack of long term sustainability of small recycling businesses with an inability to present sound investment proposals in respect of materials that are low in value and subject to price variations. This means that the industry relies on funding from agencies such as councils and non-profit organizations to supplement the resources they generate internally.

The problem with further policy progression is the lack of reliable and comprehensive data on waste volumes and the economic cost of all the current activity. This would give a clear picture in quantitative terms of what is being achieved and the value attached to these achievements in terms of recoverable material and the avoidance of other costs (e.g., the depletion of landfill space). There

is little basis for assessing whether the targets being pursued are worth achieving when the waste volumes and their associated externalities are unknown.

Without comprehensive information on the waste being deposited in landfills, it is difficult to gauge the scale of adverse effect and externality caused by landfilled wastes. However, overseas evidence suggests the economic values of residual externalities of wastes in modern well-managed landfills are less than the general operational costs of such landfills.

There is also a risk that without a better basis for assessing the costs and benefits of measured achievements, pursuing set targets will overshoot the efficient level of waste abatement and recycling and will result in excessive costs imposed on the economy. These costs are felt not only by those directly affected by the targets, but also by all consumers of waste services and other products (such as packaging). These consumers include households and businesses using material inputs into their own goods and services with potential impacts on their competitiveness.

The risk for any future policy is that now the benefits of easy waste management improvements have been achieved, the pursuit of further improvements will encounter diminishing returns to effort, and increasing cost in implementing policy. Continuing changes in the policy environment not only divert resources in affected businesses from productive activities, they also create uncertainty over what may or may not be required in future with a potentially negative effect on investment. Every dollar diverted to waste abatement has opportunity cost in alternative uses forgone, such as other environmental remediation, education, health, or business investment. If this is made explicit it may be more valuable to the public than further waste reduction.

New Zealand is not alone in losing sight of economic implications in its approach to waste management policy. Environmental impacts of waste management in OECD countries have diminished over the past 10 years in response to improved regulation and standards on incinerator emissions, landfill practices, and new technologies for handling wastes. Yet current disposal capacities continue to be regarded as insufficient in many countries and poor past practices have created a legacy of contaminated sites that exert undue influence over perceptions of the current industry. In response, local authorities set waste management charges that do

not reflect environmental externalities and fail to provide a rational basis for choosing between potential measures for waste management (OECD, 2004).

2.8. Lessons from the New Zealand Experience

A number of conclusions can be drawn from the New Zealand experience with waste and recycling. Changing the regulations and incentives improve the outcomes for the environment, but it also helps to have an institutional structure that can effectively implement the changes. In New Zealand's case, a wide range of institutional changes in the structure of local government and regulatory arrangements has contributed to cleaning up the waste management, apart from specific measures targeting waste management. In tandem, these have contributed to the de-coupling of economic growth from waste disposal growth.

The introduction of pay-per-bag charging enabled private collection and disposal services to increase their presence and increase competition in the market. This injected new commercial disciplines and efficiencies into waste management, but it also created casualties. There was at least one rural council that built a new landfill to service its residents in the 1990s, but then found that the volumes and fees it anticipated were uncompetitive with private services that hauled waste to more distant landfills.

However, given the low volumes of highly dispersed material with fluctuating prices it is difficult to build up the recycling of many materials to a scale that is sustainable and significant for the economy at large. Recycling may assist manufacturers of steel, pulp, and plastic products to secure some of their inputs, but it does not create substantial jobs or domestic demand.

Recycling businesses can be self-sustaining in large urban centers with access to substantial volumes of industrial waste, but elsewhere recycling in New Zealand has relied on non-commercial inputs from local government and non-profit sectors. These supported recycling activities have tended to focus on the less commercial end of the recovery and recycling spectrum, namely household wastes with low volume and mixed materials yielding a lower net return on recovery. This reflects a popular demand for better waste management and if it did not, local government input and voluntary contributions to non-profit bodies can be expected to reduce. This,

however, does mean there is a strong political involvement and influences from interest groups on the choice of supported activities, which may not result in the most economically beneficial activities being selected for support. The waste levy may perpetuate a portion of the industry that is dependent on the distribution of its revenues and other sources of support.

The information available on the generation of wastes and the overall waste management system in New Zealand has limitations, which hinders good management. This, however, is improving with the implementation of new legislation and should enable better assessment of the options in the future.

The evolution of waste policy in New Zealand has gone through stages similar to those identified in Japan by Hezri (2009) with a varying focus on sanitation, environmental safety, waste minimization, resource recovery, and climate policy. But the resource recovery stage has not produced a robust, industrial scale recycling sector in New Zealand. The future is likely to involve the extension of product stewardship schemes, but the experience will be different from that which is in the more populous parts of Asia. For many of the products that are being recovered and recycled, there is no large local industry to use the materials or adopt Design for Environment principles to improve the recyclability of products. The example of the e-waste sector in New Zealand is informative. The white-ware industry, which has domestic production and relative dominance of a few suppliers, has voluntarily adopted product stewardship arrangements, whereas the more diverse and less organized sectors supplying information technology appliances have yet to find a unified view of how that should be achieved.

3. New Strategy and Implications for East Asia

East Asia is a region that has experienced rapid economic growth in its bid to raise the standard of living of its peoples to similar levels as those enjoyed in developed countries. Rapid economic development has raised some pressing issues, such as dealing with the increase in waste production; and the internationalization of

waste and material flows and the simultaneous risks of some countries' low cost structures attracting waste from other countries in excess of their capacity to handle them). There are also risks of environmentally unsound waste management practices, such as those arising from the trade in second hand appliances, which are repaired by consumers and result in possible toxic or hazardous components disposed of in the general waste stream.

Rapidly growing countries need to break the link between waste production and growing affluence, as rapid growth creates a risk of wastes overwhelming the capacity to deal with them. Compounding the issue are questions of material resource security and the availability of critical strategic materials and also dealing with the slow recovery from the financial crisis in traditionally affluent markets.

East Asian countries face their own particular circumstances and need their own customized approaches to waste and recycling (APEC, 2010). Many of them already have advanced policies in this area. China, Japan, and Korea have incorporated the concept of a circular economy into laws and regulations on how discarded materials are treated, generally with the objective of recovering and reusing materials where possible and reducing reliance on imported raw materials (Lee and Na, 2010). Some have also put restrictions on imports of waste materials from other countries to avoid the accumulation of excessive waste and importation of cheaper scrap that undermines the development of domestic recycling.

New Zealand faces very different demographic and economic development conditions. Its waste policies to date, like those of other Asian countries examined by ERIA's 3R Working Group, have been oriented towards environmental protection rather than creating a strong industry around reduction, reuse and recycling, and improving resource use efficiency (Prakash, 2011). Some of the lessons from this experience include the following:

- Recycling will be under-developed if there is mis-pricing of the waste stream with the external costs of disposal that is unaccounted for.
- Recognition of the externalities of waste and the alternatives to disposal is required to build support with industry for change.
- As people become more affluent the demand for more responsible waste disposal will also grow, although it may not be sufficient for commercially viable operations.

- Municipal authorities and non-profit organizations that harness voluntary contributions can enable recycling that would not be commercially worthwhile, but there is a risk of:
    - concentrating on the low value mixed residential waste streams; and
    - losing sight of the economic rationale for diverting material from the waste stream, i.e., realising value from the net return of recovered materials and / or reducing other costs of landfill operation or environmental externalities.
- Risks and volatility in materials markets mean few countries are likely to be able to recycle all materials and will be better off trading to locations able to recycle materials.
- Waste recovery and recycling does not need to be a "race to the bottom" by countries competing to handle waste economically and compromising their environmental conditions.
- East Asian countries already have scale and other advantages with their local manufacturing capabilities for recycling, which give them greater benefits from regional co-operation and specialisation.

Encouragingly, New Zealand has apparently broken the link between economic growth and growth in waste disposal. Policy has evolved with incomplete and unreliable data on the scale of activity nationwide. An unambiguous advantage of the newly introduced waste levy is that it has improved the monitoring of volumes disposed in landfills, so there will be better information on which to base future policy.

New Zealand is a country that has championed the notions of comparative advantage and free trade by dismantling tariff protections for a range of manufacturing industries, such as car assembly and tire manufacture since the mid-1980s. However, it has little comparative advantage in recycling a variety of materials. As a small country that imports manufactured goods and appliances, its recycling capabilities are largely limited to the recovery and separation of major components, such as glass, plastics, metals, and some electronic componentry like circuit boards. The economic viability to extract valuable elements like gold, silver, copper, or rare minerals resides in countries with larger manufacturing bases and the scale to extract and reuse materials. The roles of large and small countries are complementary, but require free movement of materials between countries to make

the most of the available resources. This in turn requires clear standards on trade in materials and enforcement across trading partners (Wendell, 2011).

With the scarcity of rare earth minerals that have proved useful in developing greener technologies, such as wind turbines or the batteries for hybrid vehicles, it is not sustainable for countries to assemble them, embed them in products, and then export them to distant markets where they end up in landfills. Economic and institutional barriers that prevent them from being recovered and returned to where they can be used need to be reduced. A recycling society that truly makes the most of available resources needs to work across borders in ways that do not unduly disadvantage each locality within the broader region.

4. Policy Recommendations

Each country in the East Asian region can find an economically worthwhile role for recycling that is appropriate for their particular circumstances. They will have different emphases on environmental improvement, material recovery, and economic stimulation. However, there will be complementary roles between countries that should enable them to achieve more in aggregate through co-operation than through pursuit of individual approaches. Potential areas for co-operation include:

- supporting work that recognises the twin role of recycling in contributing to material inputs into industrial production and contributing to the improvement of environmental conditions;
- recognizing that solid waste data is often partial or unreliable and support work is needed to improve data, as well as a consistent approach to measurement across countries so that reliable information can support sound policy;
- recognizing that cross-border transfers of potentially hazardous waste and e-waste cannot be resolved by one nation alone. International co-operation needs to be developed to apply common standards and systems that enable trade in waste materials to be monitored more effectively;
- recognizing that decisions on discarding materials need to be made with an understanding of the full social costs of each option (disposal, incineration, etc.) and support work that enables municipal authorities and others in the industry to charge for waste collection and disposal; and
- developing common standards for the trade in recovered waste materials and removing barriers to valuable components being exported or imported so that they can be reused.

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