

WASTE MANAGEMENT IN NEW ZEALAND

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ABSTRACT

New Zealand is a small trading nation that is located in the south-western Pacific Ocean. The nation's pattern of resource conversion and waste generation are similar to many other developed countries, and every year New Zealand residents and industries discard over 3 million tonnes of waste to landfills and clean fills.

Environmental management in New Zealand was subject to extensive reform in the late 1980's and early 1990's, and today's environmental policies and laws reflect the concerns of both the global community and the New Zealand public. The key international obligations that address waste management practices are Agenda 21 and the Framework Convention on Climate Change that were developed as part of the Earth Summit that was held in Rio de Janeiro in 1992.

At the national level, the New Zealand Government adopted its Environment 2010 Strategy in 1995 to address a multitude of environmental issues. In order to meet these objectives, the Government has adopted a Waste Management Policy that encourages a "waste generator pays" approach and use of a Waste Management Hierarchy. This paper addresses environmental management programs, waste statistics, and waste management practices in New Zealand.

INTRODUCTION

New Zealand is located in the southwestern Pacific Ocean, approximately 1,900 kilometers southeast of Australia. The country, which has a population of approximately 3.5 million people, is comparable in size to Britain and Japan. The nation is well known for its spectacular scenery and outdoor lifestyles.

New Zealand's pattern of resource conversion is fairly similar to Australia and the affluent societies of the Northern Hemisphere. In addition, generation of wastes in New Zealand is also comparable to that of other countries in the Organization of Economic Cooperation and Development (OECD).

ENVIRONMENTAL MANAGEMENT PROGRAMS

Environmental management in New Zealand was subject to extensive reform in the late 1980's and early 1990's, and today's environmental policies and laws reflect the concerns of both the global community and the New Zealand public.

International Obligations

A number of important agreements were entered into at the 1992 United Nations Conference on Environment and Development, or Earth Summit, that was held in Rio de Janeiro, Brazil. Discussions at this conference were guided by the principle of sustainable development, which is defined as "development that meets the needs of the present without compromising the ability of future generations to meet their needs."

The Earth Summit produced five key documents on sustainable development issues, all of which were endorsed by the New Zealand Government. Of these documents, Agenda 21 is a 40-chapter plan for use by governments, local authorities, and individuals to implement the principle of sustainable development. Some of its main themes include:

- Reforming policies
- Controlling wasteful consumption and production
- Improving technologies
- Integrating trade and the environment

The second key area that relates to waste management is the Framework Convention on Climate Change (FCCC). FCCC commitments made by New Zealand along with other developed countries (Annex I Parties) include:

- Adopting national policies to mitigate climate change
- Reporting on greenhouse gas inventories (including emissions from wastes)
- Taking climate change considerations into account in relevant environmental policies

Waste Management Policy

At the national level, the New Zealand Government adopted its Environment 2010 Strategy in 1995 to address a multitude of environmental issues. The strategy includes goals and an action agenda that focus on 11 priority issues including managing waste, contaminated sites, and hazardous substances to reduce risks to human health and the environment.

Although the nation has had a variety of waste management policies over the past decade, the Government has adopted a Waste Management Policy that encourages a “waste generator pays” approach and use of a Waste Management Hierarchy. This has been incorporated into recent legislation (Local Government Amendment Act No. 4 1996), which requires local authorities to prepare waste management plans. The waste management plans must encourage reduction, reuse, recycling, recovery, and treatment before final disposal.

Furthermore, in late 1996 the new Government's Coalition Agreement included the following objectives for solid waste management:

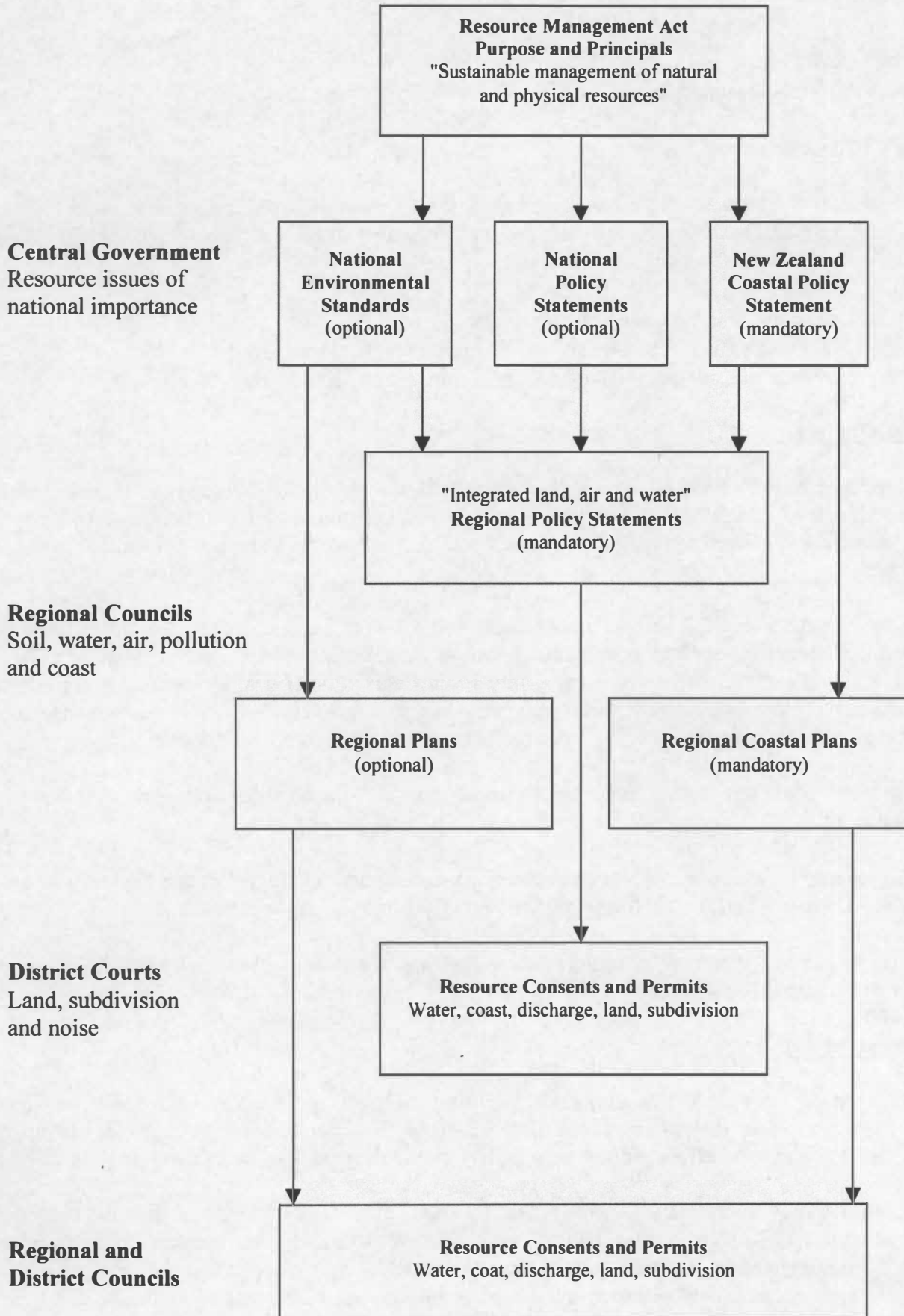
- Encouraging waste reduction at the source, reuse of products, and recycling of waste materials in order to reduce solid waste to half the 1990 level by the year 2000, and
- Continuing to develop national standards and guidelines for landfills, solid waste disposal, and hazardous waste disposal.

Resource Management Act

The Resource Management Act (RMA) was adopted in 1991 to bring together the nation's laws governing land, air, and water resources. The RMA's approach differed from the approach of previous legislation by concentrating on the environmental effects of human activities, rather than the activities themselves.

Under the RMA, no one may discharge any contaminant to water, onto land, or to the air without a consent (permit). Responsibilities for environmental decision making under the RMA are the responsibility of the community most closely affected by the use of that resource. The RMA also requires that the local authorities monitor whether the resource consents and their associated conditions are being met. Responsibilities of the various parties under the RMA are summarized on the next page.

Resource Management Act



Environmental Standards and Guidelines

The New Zealand Ministry for the Environment (MfE) coordinates development of environmental standards and guidelines to help local authorities and resource users implement their responsibilities. To date, no national standards have been enacted. However, several guidelines have been developed, and some of these may become standards in the future. Guidelines that have been developed to date that effect waste management practices include:

- Air quality
- Water quality
- Odor
- Cleaner production
- Landfill full costing

WASTE STATISTICS

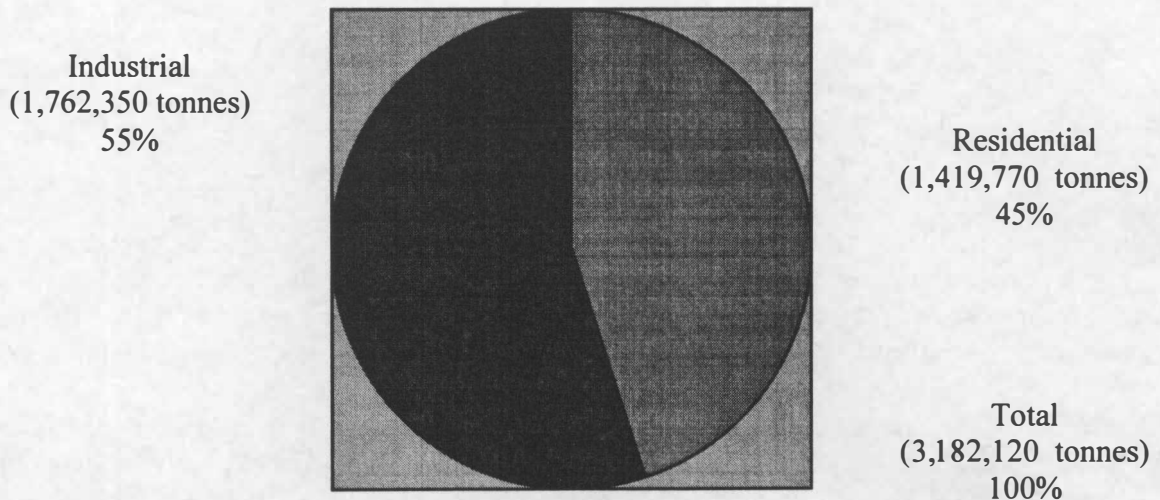
Waste Generation

There is no legal definition of waste in New Zealand, and solid waste can be generally defined as all waste that is generated in a solid form or converted to a solid form for disposal. Data on waste generation rates, waste composition, and the percentage of waste disposed to landfills was obtained from the National Waste Data Report, dated May 1997, and Waste Analysis Protocol (WAP) surveys for the period from 1993 to 1995.

Terms used in these reports consider the sources of waste sources as “residential” and “industrial.” Although this terminology is reportedly consistent with definitions and classifications used in the WAP, there is some variation from the reporting methods used by the OECD and other international reporting methodology.

Averaged across the population, each person sends approximately 1.1 kg per day of residential waste to landfills each year. Industrial waste that is landfilled reportedly averages approximately 1.36 kg per person per day. As a result, it is estimated that the total MSW quantity of solid waste that is landfilled in New Zealand is 2.46 kg per person per day. A summary of the annual weight of waste that was landfilled in New Zealand in 1995 is provided below.

Annual Weight of Landfilled Waste in New Zealand in 1995

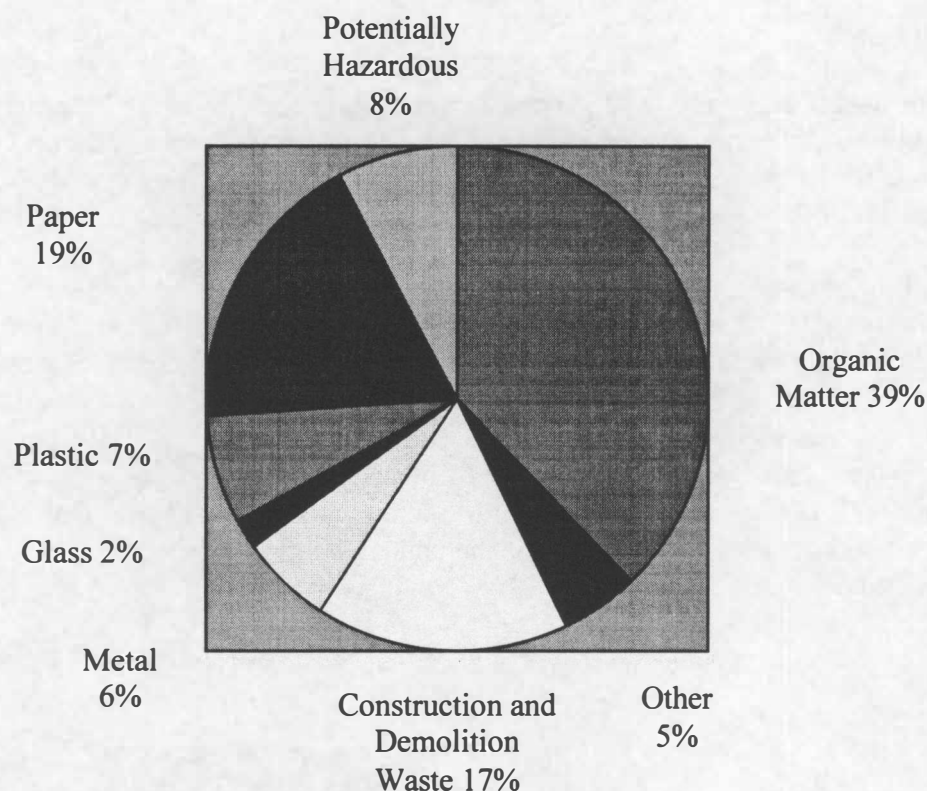


However, it has been noted that the results for New Zealand are higher than for other OECD nations. The residential result for New Zealand includes “bulky waste” associated with garden and home renovations. In addition, the industrial result for New Zealand includes construction and demolition waste. These two categories are counted separately by most other OECD nations.

Waste Composition

The WAP uses eight solid waste categories, and the composition of New Zealand’s landfill comprises a significant portion of organic waste and paper, as shown below. In addition, the composition of the solid waste stream reportedly varies significantly on a regional and seasonal basis.

Estimated Composition of New Zealand's Landfill Waste



Source: Ministry for the Environment (1997)

As indicated above, there is uncertainty over the accuracy of the nations waste generation and composition data. There is also limited national data on the quantities of waste that are recycled. In addition, there are currently no estimates or projections on future per capita quantities of waste that will be disposed to landfills in New Zealand.

As a result, it is very difficult to assess trends in waste generation in New Zealand over the past decade and to project waste generation and disposal rates in the future. However, as below, waste generation rates in New Zealand appear to be significantly impacted by economic activity.

WASTE MANAGEMENT PRACTICES

Reduction

Reduction is placed at the top of the national waste management hierarchy because it is a “waste avoidance” technique. The benefits of waste reduction include the potential to reduce solid waste management system costs, pollution, and consumption of natural resources, and to teach conservation and waste prevention.

While implementation of waste reduction is considered to be in its early stages, creative strategies are being developed and applied nationwide. These include a “cleaner production” programme that is being promoted by MfE. In addition, a “zero waste” initiative is being promoted on a national basis with private funding. The goal of this program is to reduce the quantity of waste requiring landfill disposal to zero by the year 2010.

Waste reduction programs will continue to be developed and implemented in New Zealand and these programs are primarily being driven from waste management and environmental concerns. If these programs prove to be cost-effective, they will be developed and implemented on a voluntary basis.

Reuse/Recycling/Recovery

Recycling is a “waste recovery” technique whose benefits include saving natural resources, energy, and landfill space, and providing useful products and economic benefits. There are no regulatory requirements or incentives for recycling in New Zealand, and programs are developed to meet the needs and priorities of each individual community.

Recycling programs in New Zealand include a range of strategies including:

- Source separation
- Drop-off
- Curbside programs
- Commercial recycling

Although recycling programs have been very well received by the general public, the biggest obstacle to recycling in New Zealand is the volatility or lack of markets for the recovered materials. Technologies used in recycling programs are generally very simple, rather than being complex mechanical systems.

Composting is also a “waste recovery” technique, whose benefits include saving natural resources, energy, and landfill space, and providing useful products and economic benefits. There are no regulatory requirements or incentives for composting in New Zealand, and programs are developed to meet the needs and priorities of each individual community.

Composting programs include a range of strategies including:

- Backyard
- Centralised yard waste
- Sludge composting
- Co-composting

Composting programs have also been very well received by the general public, and many of the programs have secured markets for the recovered materials. Technologies used in composting programs range from very simple backyard efforts, to complex mechanical systems.

The most significant composting facility in New Zealand is currently being developed in Wellington as a joint venture between Waste Management New Zealand and the Living Earth Company. The facility will process municipal solid waste and sewage sludge that is generated in the nation's capital city.

Other local and regional initiatives include establishment of a Resource Exchange Register (RENEW). The aim of RENEW is to extend the life and uses of discarded resources and materials, including acids, paper, machinery, durables, electronics, and metal sludges that would otherwise end up in a landfill. Registers are currently set up in two of the country's main centers and there are listings for 1,000 companies.

Treatment

Treatment by combustion or incineration is considered to be a "volume reduction" technique that is designed to reduce the quantity of waste requiring disposal in a landfill. An additional benefit is recovery and utilization of energy following combustion of the waste.

Currently there is one small incinerator operating in New Zealand. This facility is located at the Auckland International Airport and has a nominal rating of 45 tonnes per day. The incinerator does not recover energy, and is reportedly under utilized.

In addition, since the early 1990's, planning has been underway for development of a major waste-to-energy facility that would serve the Auckland and Waikato regions. In 1997, an application for resource consents was made to Environment Waikato by Nga Puawaitanga (Meremere Ltd) for recommissioning the Meremere Power Station and development of a waste-to-energy plant at the site. The proposed project would involve phased installation of 12 furnaces and the facility will have an ultimate capacity of approximately 1,000,000 tonnes of waste per year.

However, based on a 1996 report on New and Emerging Renewable Energy Opportunities in New Zealand, implementation of this and similar waste-to-energy schemes in New Zealand is considered to be highly uncertain. Since that time, the proposed project has encountered strong opposition and the resource consent process has been delayed.

A further constraint to the development of waste-to-energy facilities in New Zealand is the relatively low cost of electricity. Approximately 75 percent of the nation's energy demands are being met by hydro resources, 6 percent comprises geothermal, and the balance is from fossil fuelled thermal stations that are mostly fuelled by natural gas. In addition, there are approximately 30 electrical utility companies throughout New Zealand, and avoided cost for electricity has been in the range of NZ\$0.04 to 0.045 per kWh. However, it is expected that these rates will decline over the next few years as the utility industry continues to be deregulated.

Disposal

Landfills are the primary means of disposing of solid wastes in New Zealand. Based on the results of The 1995 National Landfill Census that was conducted by MfE, there were approximately 327 legally operating landfills in New Zealand that accepted approximately 3,180,000 tonnes of solid waste. The census data also indicated the following:

- Less than 5 percent of the landfills serve populations of over 100,000 people,
- Approximately 6 percent of the landfills serve populations between 20,000 and 100,000 people,
- Approximately 89 percent of the landfills serve populations of less than 20,000 people, and
- Approximately 135 landfills have been closed since 1987.

Historically, management practices at many of the nation's landfills have been below recognised international standards. However, the RMA requires all landfills to have resource consent approvals for land-use, and discharges to land, water, and air.

In addition, in 1992 the MfE adopted Landfill Guidelines, which were prepared by the Centre for Advanced Engineering at the University of Canterbury. The objective of this document was to provide comprehensive guidelines on the disposal of wastes in landfills and efforts are underway to update this document to reflect current industry practices.

As a result, the current trend in New Zealand is towards siting landfills at appropriate locations and designing facilities that incorporate liners, leachate collection systems, stormwater management systems, and other features in order to protect the environment. Another very important aspect of solid waste management is to ensure that landfills are being operated safely and efficiently. Industry is taking steps to improve operating practices, and the trend has generally been moving towards operating landfills in accordance with management practices and international standards that are applicable to modern landfills.

There are currently five operational landfills, where methane is being recovered and utilised as an energy source. The primary incentive for development of these projects has been the opportunity to utilise a cost-effective renewable energy source.

LFG recovery systems are also being required as part of the resource consent requirements for a number of existing and proposed new landfills. These systems are being required to control LFG odours, migration, and air emissions. The landfill gas systems have the added benefit of controlling greenhouse gas emissions from landfills in line with the nation's commitments under the FCCC.

Furthermore, landfills that have reached capacity are being closed and maintained in accordance with after-care guidelines that have been established to protect human health and the environment. The effect of existing policy is projected to be an ongoing improvement in landfilling practices and a corresponding reduction in environmental impacts and nuisances from landfills.

SUMMARY

Environmental management in New Zealand was subject to extensive reform in the late 1980's and early 1990's, and today's environmental policies and laws reflect the concerns of both the global community and the New Zealand public. As part of this reform process, the New Zealand government adopted its Environment 2010 Strategy to address a multitude of environmental issues. The strategy includes goals and an action agenda that focus on priority issues including managing waste, contaminated sites, and hazardous substances to reduce risks to human health and the environment.

Although the nation has had a variety of waste management policies over the past decade, the Government has adopted a Waste Management Policy that encourages a "waste generator pays" approach and use of a Waste Management Hierarchy. This has been incorporated into recent legislation (Local Government Amendment Act No. 4 1996), which requires local authorities to prepare waste management plans. The waste management plans must encourage reduction, reuse, recycling, recovery, and treatment before final disposal.

Although there are a number of waste management initiatives and programs in place, constraints to reduction, reuse/recycling/recovery, and treatment alternatives primarily include lack of markets for recovered materials and economics. As a result, it appears highly unlikely that the government's goal of reducing solid waste to half the 1990 level by the year 2000 will be met.

There is an ongoing effort to develop national standards and guidelines for landfills, solid waste disposal, and hazardous waste disposal and the trend is towards siting landfills at appropriate locations and designing facilities that incorporate liners, leachate collection systems, stormwater management systems, and other features in order to protect the environment. The recent landfill census acknowledges that these facilities will likely remain the main means for management of residual solid wastes in New Zealand in the future.

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