Ministry for the Environment
Manatū Mō Te Taiao

SOLID WASTE COMPOSITION

Environmental Report Card
July 2009

Summary

New Zealand disposed of an estimated 3.156 million tonnes of waste to landfills in 2006. Waste can represent the inefficient use of valuable natural resources when potentially reusable materials, such as paper, plastic, organic waste, glass and metal, are disposed of to landfills. Some wastes produce powerful greenhouse gases and others have significant health impacts on humans and animals. Waste is unsightly and can pollute our waterways, air and land unless it is adequately managed.

By gaining an understanding of what materials are being thrown away we can identify priority wastes for resource efficiency and waste minimisation programmes. Because the environmental and health impacts of waste are driven by waste type, better waste composition information can also improve management of high-impact waste types.

This report card estimates the composition of waste disposed of to landfills in New Zealand by reporting the results of waste composition audits at four national indicator sites (landfills). The sites are a sample of the 60-plus landfills across the country and provide a best available national picture of waste disposal patterns in New Zealand.

CURRENT SITUATION: Organic waste was the largest proportion of waste disposed of to landfills in 2007–2008, representing 28 per cent of the overall waste stream; rubble and potentially hazardous waste were next, representing about 15 per cent each; and timber represented 11 per cent. Potentially reusable wastes, such as organic waste, rubble, timber, paper, plastic, metal and glass, together represented over three-quarters of the waste stream.

Mixed

TREND: Between 2002–2004 and 2007–2008, the proportions of organic, plastic, glass, and nappies and sanitary waste have increased in the New Zealand waste stream, while rubble, paper and metal waste have decreased. These changes reflect changing consumption patterns, recovery rates of recyclable materials, and construction activity.

The short-term trends are consistent with longer-term trends for most waste types, suggesting similar drivers have been operating over both time periods. Changing trends have been apparent for organic waste (which has decreased over the long-term, but shown increases in recent years), and construction and demolition waste (which has grown over the long-term, but decreased in recent years). These inconsistencies are largely artificial, however, because they are caused by changes in how soil disposed of to landfills is classified.

INTERNATIONAL COMPARISON: By international comparisons, New Zealand has a mixed performance in terms of disposal of potentially reusable materials to landfills. Overall, New Zealand has a low proportion of paper disposal, average proportions of glass, organic waste, metal and plastic waste disposal, and a high proportion of 'other' waste disposal compared with other members of the Organisation for Economic Co-operation and Development (OECD).

FUTURE WATCH: Predicted falls in consumption and slow economic growth to March 2010 may influence people to reduce use or increase reuse of existing materials. The present trend of increasing proportions of organic, plastic and glass waste disposed of to landfills may flatten off or even reverse, and the decreases in paper and metal wastes may intensify.

Ongoing falls in building consent applications suggest the proportion of rubble and timber waste may also continue to drop in the short-term. However, predicted increases in New Zealand's population and the number of households may require additional construction activity. This, and planned new infrastructure investment, may result in an increase in the proportions of associated waste types in the longer term.

Reduced global demand for recyclable materials due to the recession may affect recycling operations and collections in New Zealand. As a result, we could expect the recovery rates of some recyclable materials (eg, paper, plastic and metal) to drop, which may lead to increased proportions of these materials disposed of to landfills. However, new recycling sorting and processing capacity being developed within New Zealand may offset this trend.

The Waste Minimisation Act 2008 and new targets set as part of the review of the New Zealand Waste Strategy are likely to help reduce the disposal of some priority waste types to landfills.

Introduction

Waste is "any thing disposed of or discarded" (Waste Minimisation Act 2008, section 5(1)). Waste is generated in numerous forms – solid, liquid or gas – which can change over time (Ministry for the Environment, 2002a). Waste comprises a mixture of many different materials, including organic, paper, plastic, metal, timber and potentially hazardous substances. It can be generated at different times during the material's life cycle, extraction, manufacturing and consumption (Ministry for the Environment, 2007a). In essence, the waste stream reflects changing economic activity, patterns of production and consumption (Parliamentary Commissioner for the Environment, 2004), legislation and waste management costs.

An estimated 3.156 million tonnes of waste were disposed of to New Zealand landfills in 2006 (Ministry for the Environment, 2007a).

Why is waste composition important?

Recycling 1 kg of aluminium saves up to 6 kg of bauxite rock, and enough electricity to run your television for a week.

By understanding what materials are in the waste stream we can identify to what degree valuable natural resources are being thrown away rather than reused, recycled or recovered to create other products, materials or energy. This waste composition information can then help develop waste minimisation policies, target waste minimisation programmes and improve recycling schemes. As an example, local authorities can use waste composition information to target reuse or recycling schemes for materials that make up a large part of the waste stream in their area.

An improved understanding of the make up of our waste stream can also lead to important economic, environmental and social benefits. This is because disposal of recyclable materials to landfills represents an inefficient use of valuable natural resources and energy (Ministry for the Environment, 2007a). Disposal of potentially reusable materials, such as paper, glass and metal to landfills, means these materials cannot be used again. New raw material must be used instead, creating potentially avoidable environmental impacts. Extracting and processing raw materials involves greater generation of greenhouse gas emissions, water use, pollution and energy use compared with using recycled material (Scrap Metal Recycling Association of New Zealand, 2009).

Because the environmental and health impacts of waste are driven by waste type, better waste composition information can improve our understanding of these impacts, and aid in the management of high-impact waste types. As an example, the proportion and types of hazardous waste in the waste stream have important implications for the way in which waste needs to be managed. In addition, the composition of waste disposed of to landfills is an important influence on the production of leachate, a liquid produced from the breakdown of waste that can have environmental and health impacts (Centre for Advanced Engineering, 2000).

Different materials also produce different amounts of greenhouse gases as they break down in a landfill. The waste sector generated 2.4 per cent of New Zealand's greenhouse gas emissions in 2006, with paper generating the most followed by timber and organic waste. Textiles also contribute a significant amount despite only representing a small proportion of the waste stream (Ministry for the Environment, 2008a). By having a better understanding of the composition of the waste stream we can help minimise greenhouse gas emissions from the waste sector.

The design and operation of landfills have been improving over time. This has resulted in improved management of the environmental impacts of waste (Ministry for the Environment, 2007c). In 2006, over three-quarters of landfills managed leachate in some way, over 80 per cent required documentation of hazardous waste disposal, and over 20 per cent collected landfill gas (Ministry for the Environment, 2007c). While members of the public perceive that there has been an improvement in waste management in New Zealand, in a recent national public perceptions survey waste was still considered to be a concern in terms of the damage it causes to soils, freshwater, marine and coastal environments (Hughey et al, 2008).

Text box 1: What are environmental report cards?

Environment New Zealand 2007, the country's second national state of the environment report, provided information from around 115 national-scale environmental data sets. Its primary focus was to report on the 66 national data sets that constitute New Zealand's core set of 22 environmental indicators. These indicators cover 10 domains: four 'pressures' on the environment (consumption, transport, energy and waste), and six 'states' of the environment (air, atmosphere, land, fresh water, oceans and biodiversity).

A key focus of the Ministry for the Environment's national environmental reporting programme is to produce a series of 'report cards' to provide updated information on the indicators reported in *Environment New Zealand 2007*. This is one such report card.

About this report card

This environmental report card provides information on the composition of New Zealand's solid waste disposed of to landfills.

The report card estimates the proportion of each waste type in the overall waste stream. In other words, it estimates, for every unit of waste, what percentage of the unit is made up of each waste type.

The proportion for each waste type is calculated from the quantity (tonnage) of each waste type measured during a waste composition survey.

Given the small sample sizes for our survey, this report card does not attempt to extrapolate estimates of annual tonnages at the indicator sites from the survey data available, nor provide national tonnages.

The quantity (by weight) of solid waste disposed of to landfills in New Zealand will be reported on in future once new quantity data is available from 2010.

The indicator sites studied in this report card accept municipal, industrial and hazardous waste (see text box 2 on page 4). Cleanfills, and landfills that accept *only* industrial and/or hazardous waste, incinerated waste, and legacy waste (eg, stockpiled tyres or agrichemicals) are all outside the scope of this report card.

How is waste composition measured?

Waste composition data in New Zealand comes from visual or sort-and-weigh surveys. Such surveys provide a snapshot of waste composition at that time.

The Ministry for the Environment developed the *Waste Analysis Protocol* (WAP) in 1992 to guide the collection of statistically robust information on waste composition in New Zealand. Waste materials were classified into one of eight categories (see table 1 on page 4).

Text box 2: What is disposed of in landfills and cleanfills?

Landfills and cleanfills are places in which solid waste is disposed of.

Landfills can accept municipal solid waste, industrial waste and/or hazardous waste. In contrast, cleanfills accept cleanfill: inert material, such as clay, soil, concrete or brick, that, when buried, will have no harmful effects on people or the environment. Inert materials are free of combustible, biodegradable or leachable components, hazardous substances or liquid waste (Ministry for the Environment, 2007a). Some cleanfills are also consented to accept small quantities of other waste.

Municipal solid waste is any non-hazardous, solid waste from a combination of domestic, commercial and industrial sources (Centre for Advanced Engineering, 2000). This can include food and garden waste, rubble and timber.

Industrial waste is specific to industry or industrial processes (Centre for Advanced Engineering, 2000). This can include abattoir waste.

Hazardous waste poses a present or future threat to people or the environment because of properties such as its:

- explosiveness or flammability
- corrosiveness or capacity to oxidise
- toxicity or eco-toxicity.

This waste needs treatment to make it safe or reduce its impact before landfill disposal (Centre for Advanced Engineering, 2000). This could include sewage sludge, paint and asbestos.

The Ministry reviewed and revised the WAP in 2002 and it became known as the *Solid Waste Analysis Protocol* (SWAP). The SWAP retains the core methodologies of the earlier protocol but has four additional categories. The WAP paper, metal, construction and demolition, and other categories were split into more detailed categories in the SWAP (see table 1).

+TABLE 1:
WASTE COMPOSITION CATEGORIES USED IN THIS REPORT CARD

WAP PRIMARY CATEGORY	SWAP PRIMARY CATEGORY	DESCRIPTION
Paper	Paper	Recyclable paper, such as newspaper and cardboard, and non-recyclable paper, such as milk containers and waxed paper
	Nappies and sanitary	Disposable nappies, feminine hygiene products and paper towels
Plastic	Plastic	Both recyclable and non-recyclable plastics
Organic	Putrescibles	Kitchen/food waste, green waste, other organic waste such as food processing waste
Metal	Ferrous metal	Metal products predominately made from steel
	Non-ferrous metal	Other metal, such as aluminium, copper, lead
Glass	Glass	Recyclable glass, such as bottles and jars, and other products including glass, such as televisions and computer monitors
Construction and demolition	Rubble	Concrete, rocks, plasterboard and ceramics
	Timber	Timber lengths, furniture, sawdust
Other	Textiles	Clothing, carpet
	Rubber	Tyres, foam mattresses
Potentially hazardous	Potentially hazardous	Material with potentially toxic or eco-toxic properties or having properties requiring special disposal techniques (includes sewage sludge, paint, medical waste, solvents, asbestos and oil)

Source: Ministry for the Environment, 1992; Ministry for the Environment, 2002b; Ministry for the Environment, 2008b.

The SWAP data programme began in 2002 to measure waste composition at four indicator sites – Silverstream, Kaikoura and Green Island landfills, and Matamata transfer station – using the new protocol. This established baseline waste composition data for New Zealand. These four sites were resurveyed in 2007–2008 to enable the detection of any trends over time.

The results presented in this report card are indicative estimates rather than statistically significant measurements. This is because the indicator sites are a sample of the 60-plus landfills across the country, and the high level of uncertainty in the survey method used to assess waste composition. However, the indicator sites presently represent the best available national picture of waste disposal patterns in New Zealand.

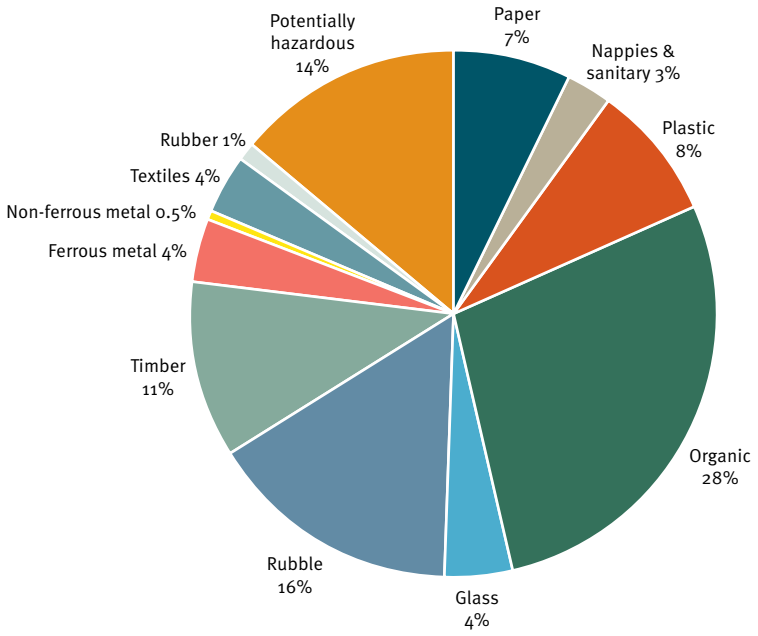
Key findings

Current situation

This section presents the findings of the 2007–2008 SWAP survey at the four national indicator sites. Figure 1 shows the waste composition to landfill in 2007–2008 at these four sites.

Cover material (see text box 3) is excluded from the analysis because it is used for landfill management. A large quantity of potentially hazardous contaminated soil disposed of at Silverstream Landfill during the survey period was also excluded because it was a one-off disposal that was unusual and significantly skewed results for that landfill (Ministry for the Environment, 2008b).

+FIGURE 1:
WASTE COMPOSITION PROPORTIONS FOR THE NATIONAL INDICATOR SITES, 2007–2008



Source: Ministry for the Environment, 2008b.

Text box 3: Why cover waste?

Many landfills cover the waste deposited to:

- decrease windblown litter
- limit run-on and infiltration of water
- control and minimise the risk of fire
- suppress site odour and minimise emissions of landfill gas
- reduce fly propagation, rodent attraction and scavenging (Centre for Advanced Engineering, 2000).

Cover typically consists of earthen materials, such as soil and clay. However, alternative materials, such as sawdust and composted materials, are used in specific circumstances (Centre for Advanced Engineering, 2000).

Organic waste

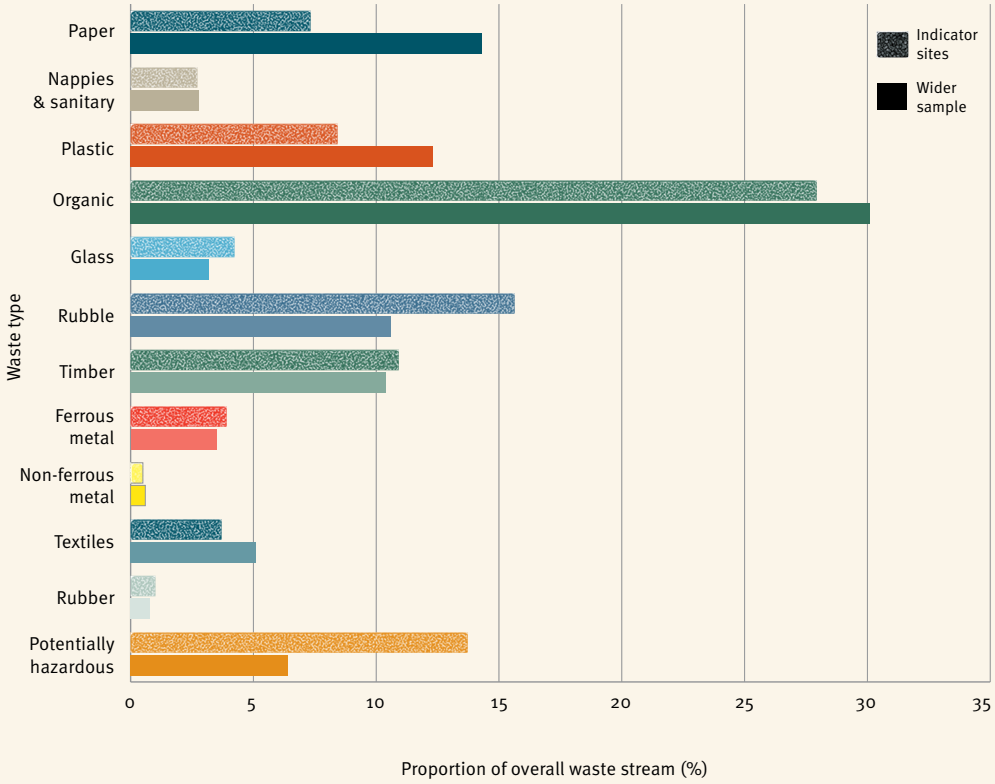
Organic waste was the largest proportion of the waste stream at 28 per cent. This waste includes garden cuttings, food scraps and food processing waste. It is produced by both commercial and residential activities.

Organic waste can be composted for reuse and to avoid disposal to landfills. Diverting organic waste from landfills can also reduce the amount of greenhouse gas emissions and leachate from landfills. However, some landfills use the gas to generate energy. For example, landfill gas from the closed Burwood Landfill in Christchurch is used to heat the QE II swimming pool and sports complex (Christchurch City Council, 2009). This produces an economic and environmental benefit from a waste product.

Text box 4: How do the indicator sites compare with a wider sample?

The composition of the waste stream is influenced by the type of economic activity and waste disposal or recycling services in each region. The waste composition of the indicator sites can be compared with those of a larger sample of landfills to determine how well the indicator sites reflect wider waste disposal patterns (see figure 2).

+FIGURE 2:
WASTE COMPOSITION PROPORTIONS FOR THE NATIONAL INDICATOR SITES AND OTHER SELECTED SITES, 2007–2008



Source: Christchurch City Council, 2008; Environment Waikato, 2007; Environment Waikato, 2008; Ministry for the Environment, 2008b; Waste Not Consulting, 2007; Waste Not Consulting, 2008a; Waste Not Consulting, 2008b.

As may be expected, there are differences between the four indicator sites and the wider sample. The indicator sites possibly under-estimate paper and plastic waste, while rubble and potentially hazardous waste are possibly over-estimated. Most waste types, however, are well represented by the indicator sites.

For both the indicator sites and the wider sample, organic waste is the largest proportion of the overall waste stream. However, while the indicator sites show rubble and potentially hazardous waste as the next largest proportions of the waste stream, the wider sample shows the next largest components as paper and plastic.

Other large waste types

Rubble (16 per cent), potentially hazardous waste (14 per cent), and timber (11 per cent) were the next largest proportions of the waste stream.

Some potentially hazardous waste does not readily lend itself to recovery, reuse or recycling because of its potential to cause harm to people or the environment. However, alternative uses are being researched or are in place for some potentially hazardous waste. Sewage sludge can be used in compost (Living Earth, 2009), and two Crown research institutes are assessing the potential positive and negative environmental effects of using sewage sludge on land in New Zealand (ESR, 2008). In addition, 21 million litres of used oil are collected and reused every year by the Used Oil Recovery Programme (Ministry for the Environment, 2007a).

Rubble and timber represent over a quarter of the waste stream and can often be reused. Rubble can be reused virtually anywhere natural aggregate is used – for example, as a base for footpaths, roads or under buildings, and as fill in earthworks (Resource Efficiency in Building and Related Industries, 2005a). Timber waste produces greenhouse gas emissions when landfilled, but some can potentially be reused in its original form. Untreated timber can be used as a bulking agent for composting (Solid Waste Association of North America, 2002) or processed into landscaping mulch, wood composite materials, or wood fire pellets (Resource Efficiency in Building and Related Industries, 2005b).

Reusable or recyclable materials

The SWAP audit at the national indicator sites also identified that a significant proportion of other potentially reusable or recyclable materials, such as paper, plastic, metal and glass, are being disposed of to landfills. These materials represent nearly a quarter of all waste disposed of to landfills in New Zealand. If organic waste, timber and rubble are also included, potentially reusable waste represents over three-quarters of the waste stream. Diverting more of these materials from landfills could ensure a more efficient use of valuable natural resources, conserve landfill capacity, and minimise the environmental impacts of extraction and processing of new materials.

HOUSEHOLD KERBSIDE RECYCLING

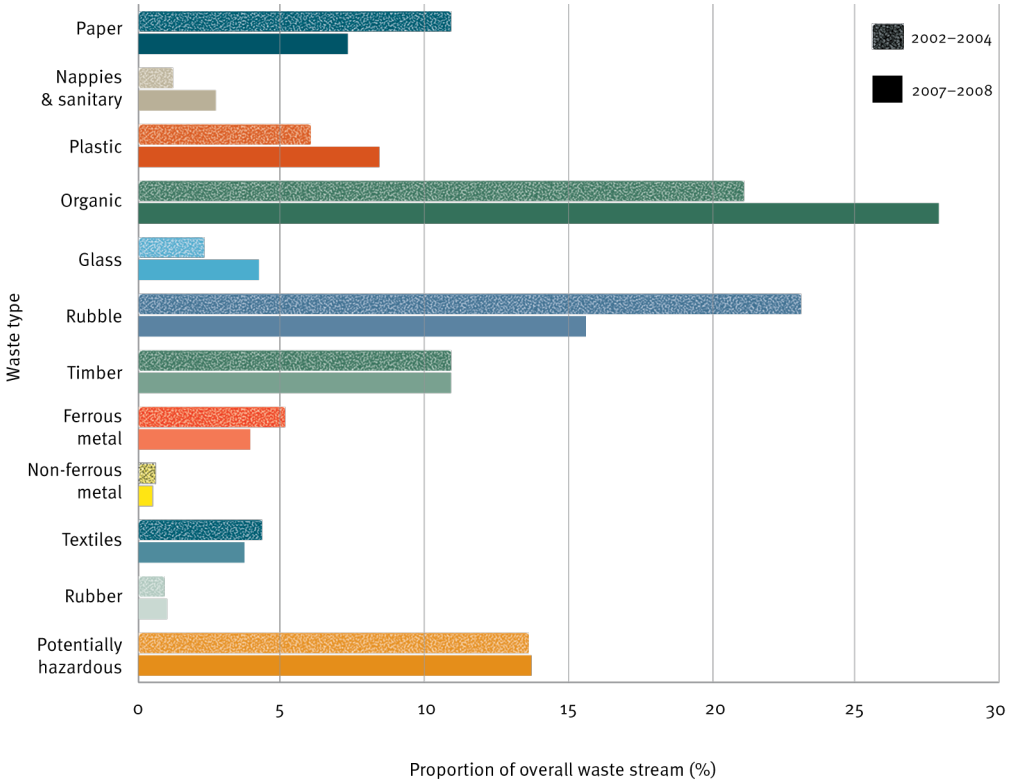
Mixed

The proportions of organic waste, plastic, glass, and nappies and sanitary waste have increased. Rubble, metal and paper waste have decreased.

Recent trends

This section reports the changes in proportions of waste composition at the four national indicator sites between the baseline SWAP survey in 2002–2004 and the follow-up survey in 2007–2008 (see figure 3).

+FIGURE 3:
WASTE COMPOSITION PROPORTIONS FOR THE NATIONAL INDICATOR SITES, 2002–2004 AND 2007–2008



Source: Ministry for the Environment, 2004; Ministry for the Environment, 2008b.

Text box 5: Note on trend interpretation

Each of the waste types discussed is presented as a change in *proportion* of the overall waste stream. Changes in proportions show which waste types have a larger or smaller share of the overall waste stream compared with earlier sample periods. This means that *relative changes* in the waste types can be observed and the *relative impact* of the drivers for those changes assessed. Conclusions about absolute changes to waste composition cannot be made because the report card does not present changes in *quantity* of each waste type.

To illustrate the lack of relationship between proportion and quantity, it may be, for example, that the quantity of all waste types increased between surveys, but the proportions of some types decreased. This could occur because quantities of some waste types have increased by larger amounts than other types.

Organic waste

Between 2002–2004 and 2007–2008, organic waste had the largest increase in proportion of the overall waste stream (see figure 3), increasing from 21 to 28 per cent.

There has been good progress in New Zealand over earlier years in the diversion of organic 'green waste' and large, single-waste streams from industry (Ministry for the Environment, 2007b).

However, diversion of organic waste from small, mixed-waste sources, such as household kitchens, supermarkets and restaurants, presents greater challenges given the fragmented sources for this waste and difficulty and cost of diversion (Ministry for the Environment, 2007b). Some local authorities are addressing this by providing kerbside composting services (C Purchas, Sinclair Knight Merz, pers. comm., 21 May 2009). However, nationwide participation in composting of garden or household waste has not changed between 2000 and 2008 (Hughey et al, 2008).

Increasing proportions of the waste stream

Since the last SWAP survey, the proportion of plastic waste increased from 6 to 8 per cent of the overall waste stream, glass waste increased from 2 to 4 per cent, and nappies and sanitary waste increased from 1 to 3 per cent.

Varying economic production and consumption patterns are likely to have influenced the change in municipal waste composition shown in figure 3 (Parliamentary Commissioner for the Environment, 2004). Inflation-adjusted spending per person increased by nearly 30 per cent on food and beverages, and 47 per cent on household goods and services between 2002 and 2008 (Statistics New Zealand, 2008c). Plastic, glass and organic waste are closely associated with this spending, for example, food, drink containers and home appliances that have been upgraded (eg, televisions). Both the generation and recovery rates of plastic and glass packaging have increased between 2002 and 2008 (Packaging Council of New Zealand, 2008). Plastic recycling rates are currently the lowest for all recyclable materials (Ministry for the Environment, 2007d), which reflects the difficulties of collecting, sorting and processing plastics (Waste & Resources Action Programme, 2007).

Changing patterns of household consumption (Ministry for the Environment, 2009a), no significant recent improvements in plastic, glass and organic waste diversion or recycling, and a nearly 20 per cent increase in births between 2002 and 2008 (Statistics New Zealand, 2008a) are likely to be contributing to these increasing proportions of the waste stream.

Decreasing proportions of the waste stream

Rubble waste had the largest decrease in proportion between 2002–2004 and 2007–2008, dropping from 23 to 16 per cent of the overall waste stream. Paper waste decreased from 11 to 7 per cent, and metal from 6 to 4 per cent.

The 2002–2004 waste survey was undertaken during a period of high and increasing construction activity, with the floor area consented for building peaking in 2004 (Statistics New Zealand 2003; Statistics New Zealand, 2008b). Consented floor area for building declined in 2005 and reduced further during the period of the 2008 survey, dropping by 24 per cent from the 2004 peak. Furthermore, increased landfill disposal costs may be leading to increased recovery or alternative disposal of rubble and timber waste, for example, rubble to cleanfills. Around 35 per cent of all concrete and timber was recycled in New Zealand in 2007, but around 80 per cent could potentially be recycled (Ministry for the Environment, 2007d). The amount of alternative disposal, however, is unknown because waste tonnages disposed of to cleanfills are not measured nationally.

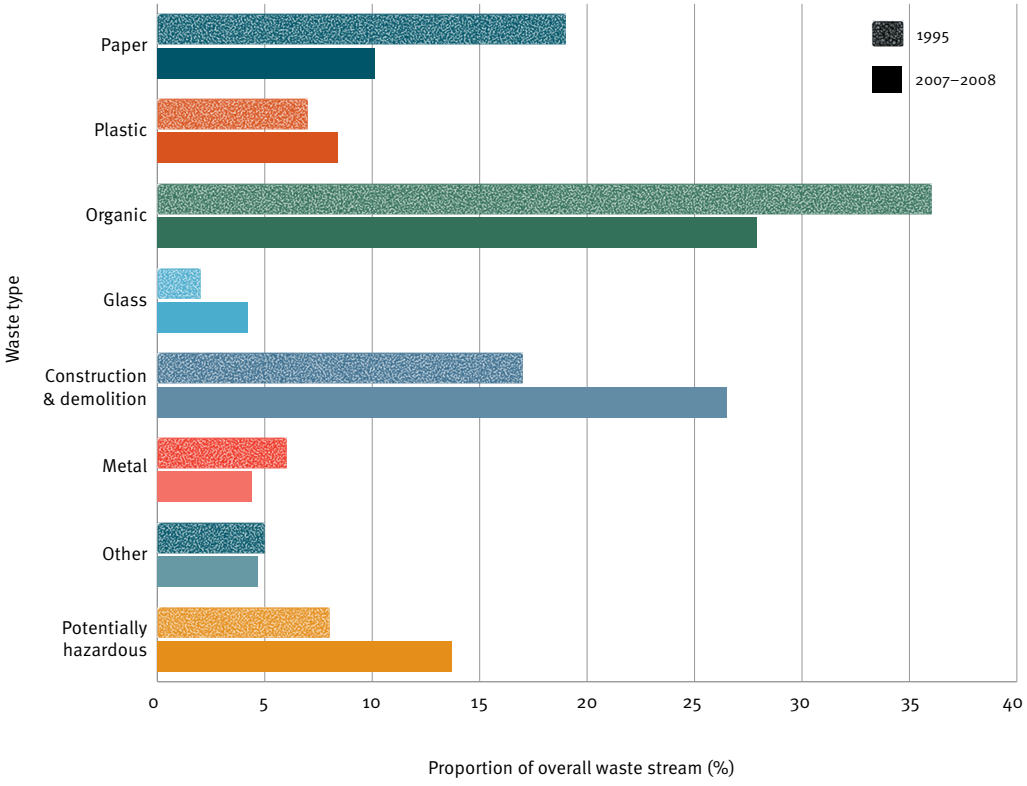
Recovery rates of paper and metal used for packaging have both had large increases between the survey periods (Packaging Council of New Zealand, 2008). Paper recycling rates were encouraging in 2007, with 67 per cent of household and 51 per cent of commercial sector paper being recycled (Ministry for the Environment, 2007d). Metal recycling rates in 2007 were 88 per cent for aluminium and 47 per cent for steel (Ministry for the Environment, 2007d). These rates reflect high consumer awareness and accessibility to recycling facilities (Ministry for the Environment, 2007d).

Changing construction activity, alternative disposal opportunities, and improved paper and metal recycling recovery rates are likely to have resulted in these waste types representing a smaller proportion of the overall waste stream now than in the past.

Long-term trends

Several SWAP categories can be combined to provide a reasonably consistent long-term data set for most waste categories (see table 1 on page 4). Figure 4 shows the recent SWAP survey data discussed in the recent trends section on page 8, combined with data collected using the WAP to provide waste composition data over a 12-year period (1995 to 2007–2008).

+FIGURE 4:
WASTE COMPOSITION PROPORTIONS, 1995 AND 2007–2008



Source: Ministry for the Environment, 1997; Ministry for the Environment, 2008b.

Consistent long- and short-term trends

Potentially hazardous waste and glass waste both increased between 1995 and 2007–2008, potentially hazardous waste from 8 to 14 per cent and glass from 2 to 4 per cent of the waste stream (see figure 4).

All of the increase in potentially hazardous waste occurred between 1995 and 2002–2004. This may reflect early progress in pilot schemes to manage potentially hazardous waste and contaminated sites (Ministry for the Environment, 2007b). In contrast, there was little change in the proportion of glass waste between 1995 and 2002–2004, and most of the increase has been in the past four years.

The proportion of paper waste in the waste stream decreased consistently between 1995 and 2007–2008 from 19 to 10 per cent of the overall waste stream. Metal waste decreased from 6 to 4 per cent, with much of this decrease occurring in the past four years.

The consistent trends over the long- and short-term suggest the factors driving those changes (discussed in the recent trends section on page 8) have also been present over this time period, although the intensity of those drivers may have changed.

Inconsistent long- and short-term trends

The SWAP rubble and timber categories have been combined in this section to allow us to show how the proportion of construction and demolition waste has changed over the long-term (see table 1 on page 4). However, not all rubble and timber is from construction and demolition.

The long- and short-term trends for organic waste and construction and demolition waste are inconsistent. Organic waste decreased over the long-term from 36 to 28 per cent of the waste stream, while construction and demolition waste increased from 17 to 27 per cent (see figure 4). However, organic waste has increased in the short-term, and rubble, a large part of construction and demolition waste, has decreased (see figure 3 on page 8).

The apparent inconsistency between the long- and short-term trends in organic waste and construction and demolition waste is expected to be due to a change in the classification of soil between the WAP and SWAP. This change has the effect of artificially decreasing the proportion of organic waste within the overall waste stream, and increasing construction and demolition waste in any long-term analysis. The adjustments in classification may, however, be masking other long-term changes in the waste stream.

By international comparisons, New Zealand has a mixed performance in disposal of potentially reusable materials to landfills.

International comparison

Comparing New Zealand with OECD data helps illustrate how our waste composition measures up against that of 30 other developed countries, and what the international 'norms' are in terms of waste disposal. This provides useful information about which waste types represent relatively large or small proportions of New Zealand's waste stream compared with other developed countries. This can highlight opportunities for further intensive diversion of particular waste types, and show which countries have successful waste minimisation policies and practices in place for these waste types.

The comparison in this report card draws on data from the 2007–2008 survey at the four indicator sites (Ministry for the Environment, 2008b) and the most recent (2007) OECD-wide waste composition data (Organisation for Economic Co-operation and Development, 2007).

Text box 6: Note on international waste types

The way that countries collect waste composition data varies. The OECD figures use six waste types (paper, organic, glass, plastic, metal and 'other') and do not include construction and demolition waste or potentially hazardous waste (Organisation for Economic Co-operation and Development, 2007). As a result, the proportions of New Zealand's waste types have been recalculated excluding these wastes for the purposes of this international comparison.

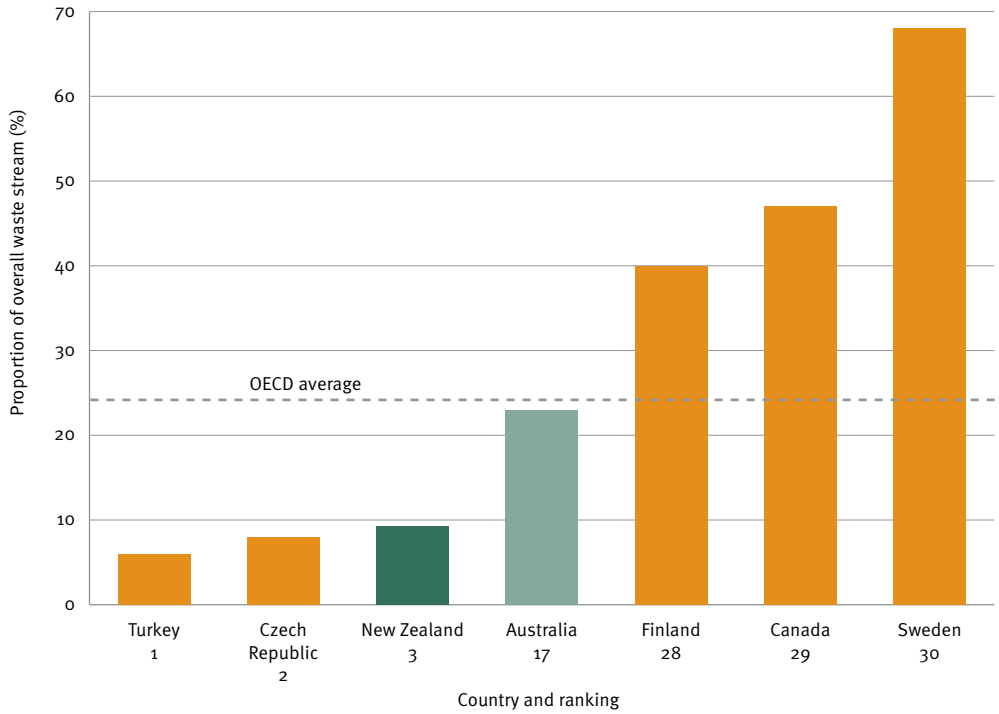
The proportions of paper, organic, glass, plastic and metal wastes therefore appear higher in this section than reported earlier in the report card. New Zealand's 'other' category includes textiles, nappies and sanitary, rubble, timber and rubber waste. A significant proportion of construction and demolition waste is rubble and timber, therefore, the 'other' category is lower in this section than if the results reported earlier were simply added together.

Overall, New Zealand has comparatively low proportions of paper waste disposal, average proportions of glass, organic, metal and plastic waste disposal and high proportions of 'other' waste disposal compared with other OECD members. Figures 5 to 7 show proportions of paper, organic and 'other' waste types in the waste stream in New Zealand, Australia and the three countries with the highest and lowest proportions within the OECD.

Low comparison

New Zealand has the third lowest proportion of paper waste out of 30 OECD countries (see figure 5). New Zealand's paper proportion is around 13 percentage points lower than both Australia's and the OECD average. The low proportion for paper may reflect the high levels of paper recovery in New Zealand (see recent trends section on page 8).

+FIGURE 5:
PROPORTION OF PAPER WASTE IN OECD COUNTRIES



Source: Ministry for the Environment, 2008b; Organisation for Economic Co-operation and Development, 2007.

Average comparison

New Zealand has an average proportion of organic waste compared with other OECD countries, and ranks 19th (see figure 6). Australia is above the OECD average for organic waste, ranking 25th equal. Our average proportion of organic waste may reflect the limited diversion of household and commercial organic waste in New Zealand, along with changing patterns in household consumption (see the current situation section on page 5 and the recent trends section on page 8).

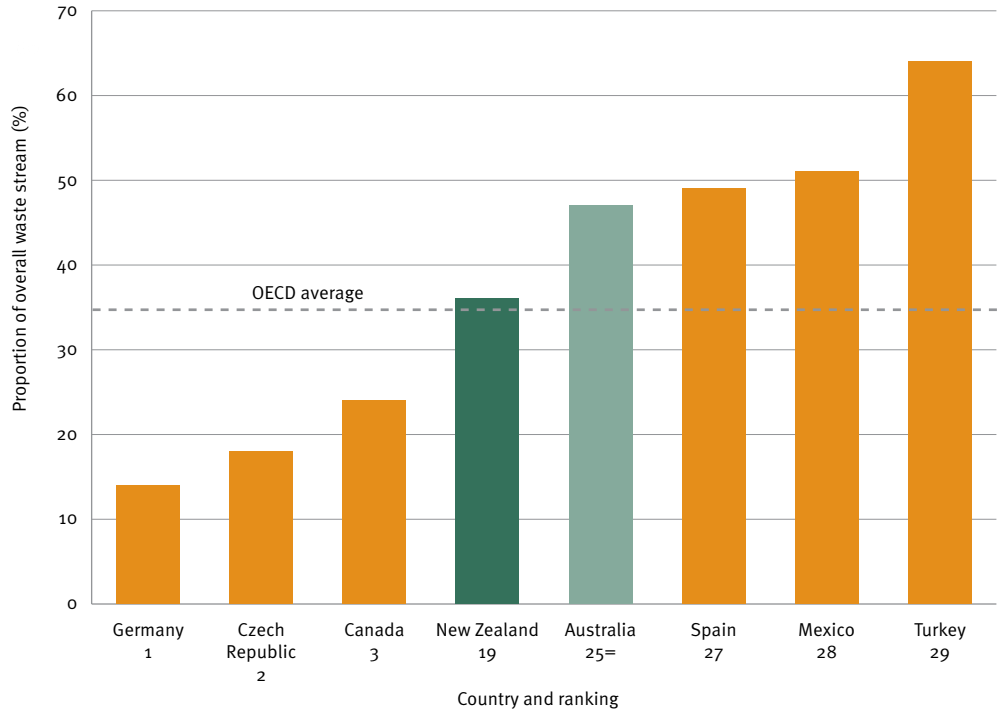
New Zealand's proportion of glass waste is slightly lower than the OECD average (ranking eighth equal), while the proportions of metal (19th equal) and plastic (19th equal) waste are both slightly above the average. New Zealand has a lower proportion of glass waste than Australia, the same proportion of metal and a higher proportion of plastic waste.

High comparison

New Zealand ranks 28th out of 30 OECD countries in the 'other' category, with our proportion being one-and-a-half times the OECD average (see figure 7). The high proportion of 'other' waste in New Zealand is likely to reflect the relatively large proportions of rubble from landscaping waste and timber from residential waste (Ministry for the Environment, 2008b). Australia has a much lower proportion of 'other' waste than New Zealand and ranks seventh out of the OECD countries (see figure 7).

+FIGURE 6:

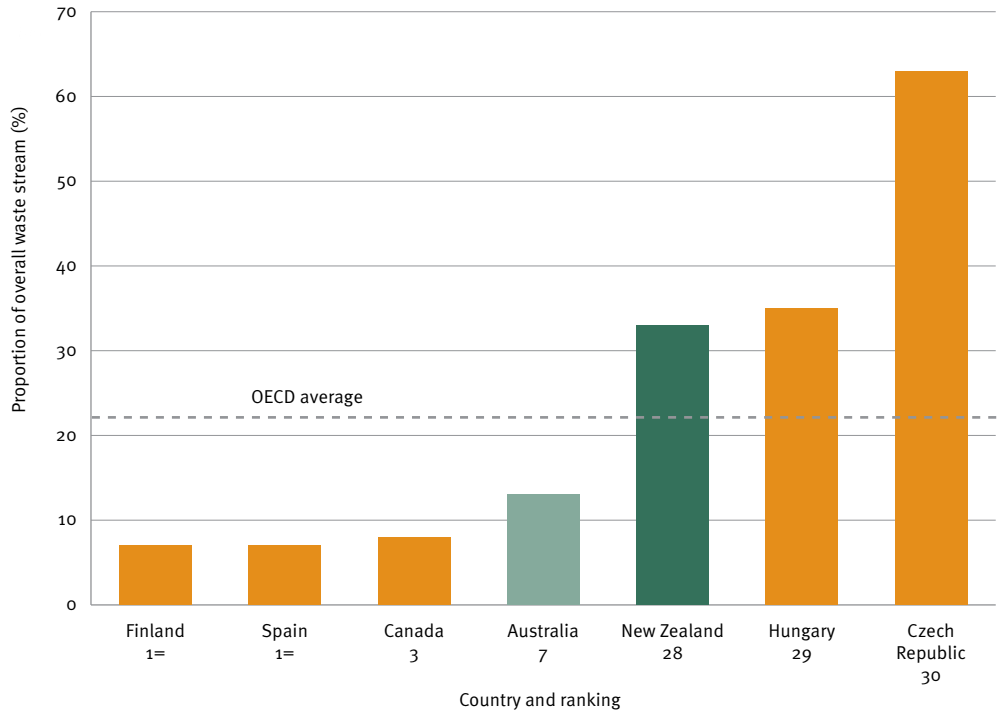
PROPORTION OF ORGANIC WASTE IN OECD COUNTRIES



Source: Ministry for the Environment, 2008b; Organisation for Economic Co-operation and Development, 2007.

+FIGURE 7:

PROPORTION OF 'OTHER' WASTE IN OECD COUNTRIES



Source: Ministry for the Environment, 2008b; Organisation for Economic Co-operation and Development, 2007.

Case study

Recycling supply and demand in New Zealand

Commercial and community recycling schemes in New Zealand have successfully diverted significant amounts of paper, plastic, glass and metal from landfills (Ministry for the Environment 2007a). The provision and availability of recycling services has increased since 1996, with 97 per cent of New Zealanders having access to services in 2006 (Ministry for the Environment, 2007a). Participation in recycling by households has also increased, from 85 per cent in 2000 to 91 per cent in 2008 (Hughey et al, 2008).

Recyclable material can be generated anywhere in a product's life cycle from production to consumption. The supply of recyclable materials can be influenced by:

- commercial and community recycling collections
- manufacturer and consumer behaviour
- access to and costs of other disposal options, such as second-hand stores or landfills.

OTHER DISPOSAL OPTIONS: DONATING CLOTHES

Local authorities' responsibility for waste management was strengthened by legislation during the 1990s, including an amendment to the Local Government Act in 1996. This has been further strengthened by the enactment of the Waste Minimisation Act 2008. The Act requires territorial authorities to prepare waste management and minimisation plans that must consider management methods in the order of the waste hierarchy (see sidebar). Managing waste at higher levels of the waste hierarchy has environmental benefits, and is also likely to provide economic benefits in the longer term.

The waste hierarchy encourages waste management by:

- reduction
- reuse
- recycling
- recovery
- residual waste disposal.

Recycling schemes not only need a supply of materials to succeed, the recycled material also needs to be sold. The sale and use of recycled materials is driven by demand, which is reflected in the prices. The demand for recyclable materials is influenced by:

- the prices of new raw materials and energy
- the economic activity where the materials are processed and used
- whether recyclable materials are raw or processed
- the quality of the recyclable material (eg, sorted and cleaned)
- transport availability and costs.

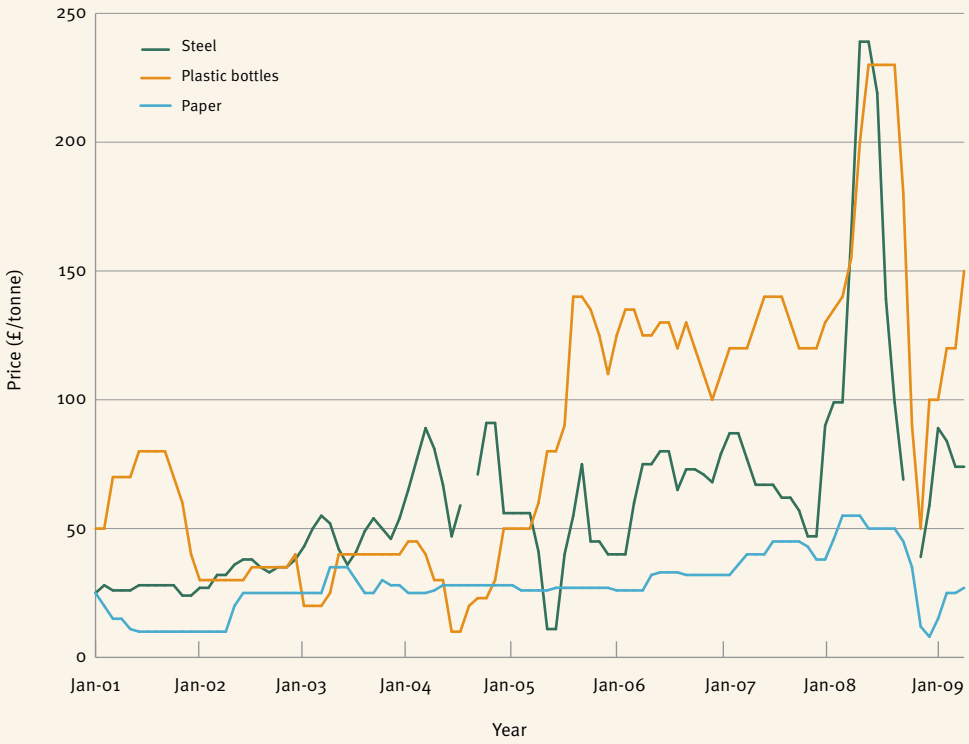
ALUMINIUM CANS READY FOR SALE

Some recyclable materials, such as paper, plastic and metal are internationally traded goods and subject to international market forces. Given the relatively small size of our domestic market, a high proportion of these materials are exported (Gibson, 2009). This means recycling schemes in New Zealand are highly exposed to the prices of international markets on which recycled materials are bought and sold.

While New Zealand prices are not exactly the same because of differences between local and international drivers, the UK prices shown in figure 8 provide an indication of prices, and demand, in the international market over the past nine years.

The figure illustrates that prices for recyclable materials have shown large fluctuations since late 2007. Strong demand for recycled material for building in China and southeast Asia during late 2007 and early 2008 has contributed to the sharp price rises for these materials observed in the United Kingdom and other large markets. However, prices decreased sharply in late 2008, largely because of reduced demand in China and southeast Asia following the global economic recession (Gibson, 2009; Vickers, 2009). These prices recovered, however, in early 2009 and are now similar to prices before the late 2007 peaks.

+FIGURE 8:
UK PRICES FOR RECYCLABLE MATERIALS, 2001–2009



Source: Letsrecycle.com, 2009.

Future watch

Because waste is a core by-product of economic activity, the future composition of the waste stream in New Zealand can be expected to closely reflect future patterns of production and consumption. Household consumption of goods and services is predicted to fall in the year ended March 2009 and grow modestly in the year ending March 2010 (NZIER, 2009). As a result, the present trend of growth in some waste materials associated with consumption (eg, plastic, glass and organic waste) may slow or even reverse.

Construction activity has continued to drop since the survey period (2007–2008), with fewer new buildings being consented (Statistics New Zealand, 2009). If this trend continues, the proportions of rubble and timber waste in the waste stream are also expected to drop. However, in the medium term, New Zealand's population and the number of households are predicted to increase between 2008 and 2021 (Statistics New Zealand, 2005; Statistics New Zealand, 2007). This may place increasing pressure on housing in future and drive additional construction activity. This, and increased investment in major infrastructure (New Zealand Government, 2008), may result in increased disposal of associated waste types.

Anecdotal evidence suggests some recycling operators in New Zealand are stockpiling materials where possible because of the current reduced global demand and prices for recyclable goods (Gibson, 2009; Neems, 2009; Vickers, 2009). If low global prices continue, there is a risk that

some recyclable materials may no longer be collected, or some collections may stop. This would reduce recovery rates and increase disposal rates of recyclable materials to landfills. However, new recycling sorting and processing capacity currently under development within New Zealand will create opportunities for commercial and domestic recycling schemes (Field, 2009). This may help maintain or further improve recovery rates, and therefore decrease the proportion of recyclable materials being disposed of to landfills.

New waste policy may also affect the future composition of waste in New Zealand. The Waste Minimisation Act 2008 introduced a levy on landfill waste disposal and a fund for waste minimisation activity. The Act also encourages product stewardship schemes (where responsibility for managing and minimising waste begins when a product is produced, and lasts through to its ultimate end (Ministry for the Environment, 2009b)) and provides for improved reporting on waste disposal. In addition, a review of the New Zealand Waste Strategy is also underway, which is likely to set new national waste targets. Both initiatives could reduce the proportions of some waste types in landfills, particular those waste types that are priorities for waste minimisation or product stewardship schemes.

Further information

For further information about the state of waste in New Zealand see *Environment New Zealand 2007* at www.mfe.govt.nz. To find out more about SWAP surveys and results see *SWAP Baseline Programme* at www.mfe.govt.nz/issues/waste/waste-data/swap-baseline.html.

For more information on waste policy see *The New Zealand Waste Strategy* on the Ministry for the Environment's webpage at www.mfe.govt.nz/publications/waste/waste-strategy-mar02/index.html. For further information on how to reduce your rubbish see *Rubbish* at www.sustainability.govt.nz/rubbish.

Technical notes

Limitations of the indicator

The indicator includes only solid waste disposed of to landfills. It does not include waste disposed of to cleanfills or landfills that accept *only* industrial and/or hazardous waste, incinerated waste or legacy waste (eg, stockpiled tyres or agrichemicals). Liquid, gaseous and hazardous wastes are not specifically measured by the indicator (although potentially hazardous waste is included in estimates of solid waste disposed of to landfills).

Waste composition data is based on physically sorting or visually estimating the various components of the waste stream in each vehicle sampled. Because of the high degree of variation in the proportions of waste types in each vehicle sampled, the measurements have a precision of ±20 per cent for major components. The precision is likely to be lower for smaller components of the waste stream (Ministry for the Environment, 2007b). It should be remembered that all results presented in this report card are, therefore, indicative estimates rather than statistically significant measurements.

The indicator does not measure any activities aimed at minimising waste and increasing resource efficiency, such as improvements to production methods. Nor does it measure the decoupling of waste generation from influencing factors, such as population and economic growth.

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FOR MORE INFORMATION about solid waste composition see *Environment New Zealand 2007* at www.mfe.govt.nz

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