



## PUTRESCIBLES REPORT

### INTRODUCTION

It has been proven time and again, with every waste audit report that lands on your desk that organic waste accounts for approximately 50% of a householders bin.

It seems ironic that while organic materials are the biggest pollutant in our landfills through leaching and methane production, our soils are crying out for the application of organic products, micro- nutrients and microbes in response to intensive agricultural processes.

*Fact* - Soil degradation in countries around the world is becoming an increasing reality – in Australia, 80% of soils have less than 1% organic matter. Many other countries including China, most of the European countries and the UK are experiencing similar problems. (Gerard Gillespie, Biocycle Feb 02.) New Zealand is no exception.

By separating our waste stream into a range of manageable and useful resources we will begin to see much higher diversion rates. Eliminating organics from our household waste allows the commingled dry recyclables to be removed, more easily sorted and marketed. By controlling what goes in to landfills we have a greater chance of controlling what comes out!

One of the biggest challenges in diverting organic waste is overcoming the perception that segregating this waste is even more work on top of our usual recycling habits, it is 'dirty' and generally a nuisance. However, through a well-organised education and communication programme these obstacles can be overcome.

This report highlights some of the approaches taken by Councils and community groups throughout New Zealand in dealing with the organic fraction of our waste stream as well as case studies from around the world. It demonstrates there are many strategies available for diverting organic waste to beneficial uses.

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June 2002

## New Zealand Waste Strategy

'Towards zero waste and a sustainable New Zealand'.

### Targets for Waste minimisation

As part of the New Zealand Waste Strategy, the Ministry for the Environment (MfE) recognises that organic wastes (garden, kitchen, food processing and sewage sludge) form a large proportion of the waste stream. *"It has been calculated that a 60% reduction in landfilled garden waste would bring total landfill volumes down by as much as 800,000 tonnes and save around \$40 million in disposal costs each year."*

Targets have been set to reduce the amount of this waste stream going to landfill. These include:

- By Dec 2003, all territorial local authorities will have instituted a measurement programme to identify existing organic waste quantities, and set local targets for diversion from disposal.
- By Dec 2005, 60% of garden wastes will be diverted from landfill and beneficially used, and by Dec 2010, this diversion rate will have exceeded 95%.
- By Dec 2007, a clear quantitative understanding of other organic waste streams, such as kitchen wastes, will have been achieved through the measurement programme established by Dec 2003.
- By Dec 2007, more than 95% sewage sludge currently disposed of to landfill will be composted, beneficially used or appropriately treated to minimise the production of methane and leachate.
- By Dec 2010, the diversion of commercial organic wastes from landfill to beneficial use will have exceeded 95%.

### New Zealand Initiatives

Within New Zealand there is a growing number of composting facilities now handling food and green waste. On site small scale composting systems at schools and other establishments are also on the rise. These range from in- vessel systems to simple worm bins.

- **Waitakere City Council** –Residents bring their separated green waste to the transfer station in Waitakere. The Vertical Composting Unit (VCU) system is the central tool in the green waste recycling programme and has just completed its first year of operation collecting 8000 tonnes of green waste. Council is responding to new targets set by the Ministry for the Environment by applying for a resource consent from Auckland Regional Council to start trialling food waste collections.

Contact Ben Somaratne, Solid Waste Engineer, 09 836 8503 or [ben.somaratne@waitakere.govt.nz](mailto:ben.somaratne@waitakere.govt.nz) for more details.

- With the recent closure of all three landfills in the district, **Mackenzie District Council** has become the first Zero Waste Council in New Zealand to implement a three bag collection system to include the weekly collection of food and green wastes in green bags. Composting options were heavily investigated and the Council has now invested in a 25m<sup>3</sup> VCU called J.O.A.N (Just Organic And Natural) that is installed at one of the three newly opened resource recovery centre's. As well as being supplied from households, businesses in the Mackenzie District are also interested in feeding the VCU, including The Hermitage at Mt Cook which serves 1000 meals per day and separates all its waste streams.

Contact Rachael Harrison, Waste Strategy Implementation Manager, 03 685 9018, or [Rachael@mackenzie.govt.nz](mailto:Rachael@mackenzie.govt.nz)

- **Kawerau District Council** is processing three tonnes of sewage a week. This is fed to worms in large beds and becomes vermicast. All schools in the district are now worm farming food wastes.  
Contact Tom McDowall, Operations and Services Manager, 07 323 8779, or [tom.mcdowall@kawerau.govt.nz](mailto:tom.mcdowall@kawerau.govt.nz)
- **Christchurch City Council** recently carried out an eight week trial collection of food waste. After doing a mail drop to 2000 households in two areas of Christchurch, 500 positively responded to participating in the trial. Participants were given a four litre benchtop bin and 20 litre kerbside bin. Half were given biodegradable bags to line their bins, the other half were given EM Bokashi (referred to later in report). After the first week, two tonnes were collected, with a 100% set out rate. Council staff are looking at putrescible processing technologies with the view to establishing a permanent food waste collection further down the line.

The final report analyses the costs, operational issues and community acceptance and participation in the scheme.

To see the report, go to [www.ccc.govt.nz/Compost/KitchenOrganicsCollectionTrial.asp](http://www.ccc.govt.nz/Compost/KitchenOrganicsCollectionTrial.asp)

For more details of the trial contact Tony Moore, Resource Analyst, 03 372 2426 or at [tony.moore@ccc.govt.nz](mailto:tony.moore@ccc.govt.nz)

- **Rakaia Resource Recovery Group** operates the resource recovery scheme in Rakaia, Mid Canterbury on a voluntary basis. The group is running a two-bag system for 900 households, collecting wet (organic) and dry (inorganic) materials. Guidelines for the wet bag say they will take anything that rots! Once collected, the materials are fed onto a conveyor belt taking it to a chopper where the materials are finely chopped and then loaded into a large concrete mixer. After several weeks of churning, the full partially decomposed load is spread onto the ground into one metre wide, 40cm deep beds where worms are added and the pile is covered with carpet or black polythene and left to decompose further. They process 20m<sup>3</sup> of recycling each week and only one metre<sup>3</sup> residual waste.

Contact Neil Pluck, 03 302 7031 or [plucky@xtra.co.nz](mailto:plucky@xtra.co.nz)

#### **Rakaia Resource Recovery Group's organic waste processing unit**



- **Innovative Waste Kaikoura (IWK)** is based in Kaikoura, North Canterbury and diverts 2800m<sup>3</sup> each year of green waste from landfill. Currently it is mulched and windrowed but IWK have nearly completed building their own "horizontal composting unit" that will be fed green waste and putrescibles, picked up as part of their kerbside service from restaurants in Kaikoura. This service will eventually be extended to households. The quality of the compost produced is not guaranteed under the present system so is given away to the

public. However, once the system has been tested it is hoped the compost quality will improve. Quality of mulch produced is high and is sold.

Contact John Ransley, 03 319 7148 or [iwk@xtra.co.nz](mailto:iwk@xtra.co.nz)

- **Waitakere Special Needs Trust** set up the Worm Firm through Arohanui Special School in Waitakere. The scheme originally hired out and maintained worm farms for a cost of \$50 a year to householders in the West Auckland area. Students from the school make the bins from recycled plastic barrels originally used in industry. The bins are now being sold to the public for the same price. Profits from the scheme are fed back into the school.

Contact Brett Olsen, 09 818 0510

- **Rodney District Council** has installed a Hot Rot system to process sewage. The Christchurch-manufactured unit, which cost Rodney about \$200,000, is processing screenings from the sewage sludge with green waste to reduce the moisture content. The compost will be used on the council's parks and reserves. Council's draft Zero Waste document includes plans to deal with residential and commercial organic waste. Proposed initiatives include investigating and planning for organic (garden and kitchen waste) collection systems from the kerbside and to undertake a range of composting initiatives including the promotion of well managed back yard composting and establishing large scale composting operations to process large volumes of organic waste. Staff expect reductions in the total waste stream by 14% within three years as a result of these initiatives.

Contact Julie Harrison – Zero Waste Coordinator, 09 426 5169.

- **Palmerston North City Council** is aiming to start removing putrescibles from the waste stream by setting up a pilot project, targeting five or six local restaurants for their food waste and will then look at including further eating houses, businesses, hospitals and industry within the area. Council has already been promoting the use of home composters to deal with the domestic organic fraction. A worm farm has been set up in every school, college and kindergarten and they are looking at setting up a project at Massey University, removing putrescibles from the staff and student canteens to be composted and then used on the gardens. They are currently doing this with garden waste from the site.

Contact Alan Fielding, 06 356 8199 or [alan.fielding@pncc.govt.nz](mailto:alan.fielding@pncc.govt.nz)

- **Wastebusters Trust Canterbury.** Ashburton Wastebusters Education centre has a range of worm farms and composting systems set up enabling the general public to see how they work as well as providing an opportunity for home composters to bring their problems or even their systems in to the experts on site. Over 50 schools in the Selwyn and Ashburton district have worm farms – managers go into the schools to educate the children about maintaining worm farms.

Contact Sheryl Stivens, 03 308 9998 or [mcwastebusters@clear.net.nz](mailto:mcwastebusters@clear.net.nz)

## **Commercial Processing methods available in New Zealand include:-**

### **Vertical Composting Unit (VCU)**

The VCU is an “in- vessel” system designed in New Zealand. Vertical Composting Technologies Ltd has installed three units so far within New Zealand but has extended their technology overseas. The VCU processes virtually all types of organic waste including bio solids and paper/ cardboard and can take between 1.6 and 3.25 tonnes per day, depending on the cycle. With pre- treatment such as shredding, the cycle time to harvest can range between 7 and 28 days. Odour control is achieved through passive airflow and self- biofiltration. The harvested end product requires static piling before it can be used.

For more details contact VCU Technology on 09 571 0266 or [info@vcutechnology.com](mailto:info@vcutechnology.com)

### **New VCU installed in Twizel, Mackenzie**



### **Hot Rot Composting Systems**

This is another in- vessel composting system using a horizontal cylinder rotating shaft technology. It can handle a wide range of organic waste including farm animal waste, rags and wool processing wastes. Processing times are between 10 and 20 days. Systems are available in a variety of sizes ranging from units capable of processing from 500kg to nine tonnes of waste per day.

For more details contact Hot Rot Composting Systems on 03 325 6685 or [info@hotrotsystems.com](mailto:info@hotrotsystems.com).

### **Hot Rot Composting System**



### **Effective Micro- organisms (EM)**

EM is a mixed culture of naturally occurring beneficial micro – organisms. It can be used as a compost inoculant, to ferment kitchen food scraps, or to control odours. It is applied in both dried “bokashi” (wheat, bran and sawdust pre inoculated with EM) and in liquid forms.

The New Zealand Natural Farming Society is setting up the EM system of composting where food scraps are placed in a bucket with bokashi, squashed and sealed and when

full left to ferment for 7 –14 days. The liquid is collected and can be used on plants. The remaining food scraps can be buried in the garden. Tests so far demonstrate there are no odours from this easy method of composting.

Available in Christchurch from Garden City Composting at \$14 per kit.

**For more information go to** [www.kiwiorganics.co.nz/bokashi](http://www.kiwiorganics.co.nz/bokashi) and the EM Research Organisation (EMRO) in Japan – [www.emro.co.jp](http://www.emro.co.jp)

### **Some Local Inventions**

For community groups who are operating under a limited budget yet are keen to process waste on site, alternative creative solutions have to be found. Processing systems do not have to be designed to take in huge volumes of waste or be as expensive as the commercial technology currently on the market.

Examples of kiwi ingenuity include:

The enclosed horizontal composting unit designed and built by **Innovative Waste Kaikoura** that is capable of processing green and food wastes from the area.

### **Horizontal Composting Unit, IWK**



The large cement mixer modified by **Rakaia Resource Recovery Group** that processes all organic waste.

Recovered plastic barrels that are made into worm bins by **Waitakere Special Needs Trust**.

### **Composting standards in New Zealand**

No mandatory quality standards exist for vermi-products in New Zealand. Australia has initiated the development of product standards and process guidelines, led by the Australian Worm Growers Association. However, voluntary standards for compost products exist within New Zealand, developed by a working party made up of a number of compost manufacturers, including Living Earth Ltd. These are now administered by the Nursery and Garden Industry Association. The objectives of this standard are:

- a. To protect consumers from using compost that may have an adverse effect on plant growth;
- b. To protect the environment from any actual or potential adverse effect from application of compost products to land;
- c. To protect compost manufacturers by being able to demonstrate to regulatory authorities that adherence to these standards will meet the requirements of Section 15 (1) of the Resource Management Act 1991. Hence compliance with these standards will ensure that the application of compost to land is environmentally sustainable;
- d. To effect the Ministry of Health recommendation that compost products display safe handling procedures for consumers.

New voluntary guidelines for the safe and beneficial use of bio-solids (sewage sludge) will be released shortly.

## **Overseas initiatives**

A wide range of reports are available showcasing overseas initiatives dealing with organic waste.

## **EUROPE**

The European Landfill Directive places targets on Member States to reduce the quantities of biodegradable municipal waste (BMW) going to landfill. By 2016 BMW going to landfill must be reduced to 35% of the total amount of weight of BMW produced in 1995.

Some countries and regions have adopted, or are considering outright bans on the landfilling of the entire biodegradable fraction of the municipal waste stream while others have introduced a taxation system to increase the cost of landfilling as to make recovery options more economically viable.

The Flemish region of Belgium has seen a significant drop in landfilling of BMW and has coincided with a decrease in incineration and an increase in composting and recycling, mainly of paper. The Netherlands has achieved high landfill diversion rates partly through widespread separate collection of food and garden waste.

(Ref. European Environment Agency, Biodegradable municipal waste management in Europe. Available from [www.eea.eu.int](http://www.eea.eu.int))

### **Gent, Flanders, Belgium**

There are approximately 100,000 households in the Flemish region of Gent. Their household waste plan (1997 – 2001) includes:

- reduction targets of 6% by 2001 and of 10% by 2006
- recycling rates of 52% by 2001 and 55% by 2006
- each municipality must generate less than 150kg/ inhabitant/ year of residual waste by 2006.

Eight of the 20 incinerators in existence in 1991 have now been closed despite bans on landfilling in place since 1998.

Several requirements by law for waste collection include the provision of a containerpark (resource recovery centre) in every municipality, and the collection of garden, fruit and vegetable waste from households every fortnight from a compostable bag or small container. Home composting is also promoted.

Doorstep collection methods differ according to the area of the city. Examples of technological innovation in this field are high with intelligent chips installed on bins being used to record household details, including the nature of waste collected. Here, the Polluter Pays Principle is implemented. Information is fed to a computer in the truck and is then sent through to a central computer system for processing. Householders pay in advance for 18 emptyings of their bin. If payments are not kept up to date the bin cannot physically be emptied.

Between 1995 and 1999 separated waste collection has increased from 31% to 61%.

The waste management company, IVAGO, have listed some valuable lessons learned including:-

- Take time to evaluate your systems (between one and two years.)

- Believe in your “citizens” – once systems are implemented change can occur quickly.
- Collect organic waste weekly.
- No- one should have 240 litre bins.

### **In Gent, Biobags are used for the collection of food waste**



(Ref. Hogg et al 2002 ‘Towards Sustainable Waste Management Practice – Case Study report’ (SNIFFER – Scotland and Northern Ireland fund for Environmental Research) Project SR (02) OSB April 2002)

### **Italy**

Italy’s waste management law, passed in 1997, set recycling targets at a minimum of 35% by 2001 and required the level of fermentability in residual waste to be reduced by 90% of untreated levels. Therefore local authorities had no option other than to tackle the organic waste stream. Now more than 1000 municipalities have introduced source separation of organic waste.

The five key features of the Italian system are:

- Treating food and garden wastes separately – food wastes are quick to putrefy in the Italian climate and need regular pickup. Home composting programmes target garden waste.
- Organics account for 30 –35% of waste in a householders bin. Cutting the proportion of organics in residual waste is a priority in programme design.
- Convenient, easily monitored household bins are key. A benchtop bin lined with transparent biodegradable plastic bags are used in the kitchen – the bags are then placed in a larger bin for collection.
- Wheeled bin collections from apartments, restaurants and food shops are integrated with low rise organic collection.
- Small collection vehicles are used because of the high density of food waste. In Monza, the vehicle, with a small skip on the back, is operated by a single person. It loads to 0.7 tonnes/ hr and does five loads a day, serving over 2000 homes/ traders.

Monza is achieving high recycling rates, alongside other Italian municipalities, diverting over 50% of its municipal solid waste. Food waste is the largest contributor to this figure. The impact on reduction of waste to landfill has been huge and high quality of compost applied to agricultural land means that the problem of soil degradation can now be tackled. Since this programme has been introduced municipalities have seen savings in their budgets. This is mainly due to collection vehicles and bins being cheaper as well as less staff being needed out on the rounds.

(Ref. High Diversion, The Italian Way – Robin Murray, Resource Magazine (a UK independent not- for- profit publication), P.30, Volume1, No 3, March 2002. Available from the Zero Waste New Zealand Trust office).

### **Collection vehicle – Monza**



### **Community Composting Network, UK**

The Community Composting Network (CCN) was established in the UK to coordinate community composting operations across the country. Community composting represents a cost effective way of collecting and processing organic waste, whilst providing a social focus for further waste reduction activity.

Community composting projects are set up in local areas and are run in parallel with home composting activities. The emphasis is on taking organic waste that the householder cannot deal with in his/ her backyard.

In comparison with centralised composting facilities, local composting ensures waste is only moved small distances, using less fossil fuels as well as providing a cheap and local source of compost.

The number of households served is typically a few hundred. Some schemes operate a pick up service. Capital equipment varies between groups. All schemes take garden waste, a few take uncooked kitchen waste. Sites are typically located by community centres, allotments, city farms or similar. The mature product is sieved and screened and then bagged for collection by the community either free or at low cost.

There are a number of case studies of projects operating in the UK that are available in detail from the CCN at [www.othas.org.uk/ccn/index](http://www.othas.org.uk/ccn/index).

## **AUSTRALIA**

### **Australian Capital Territory (ACT), Chifley, Canberra.**

Canberra adopted a 'No Waste by 2010' policy in 1997.

In the ACT, domestic garbage bins include 52% food and kitchen wastes. A household three-bin collection system, to include organic material was trialled between August 2000 and June 2001.

The objectives of the trial were:

- To trial the separate collection of food and kitchen wastes for reprocessing
- To investigate the amount of food and kitchen waste generated by a suburb containing approximately 1000 residences and to monitor the seasonal variations.
- To determine the viability of separately collecting food and kitchen wastes from the residual garbage stream and reduce the frequency of residual waste collections.
- To process the material into a reuseable product that meets Australian standards.

There was a high amount of public consultation before and during the trial to identify household practices and to obtain information for progressive evaluation. Education was key; information pamphlets and questionnaires were delivered throughout the trial as well as a resident package that included a calendar and information brochure explaining the three bin system.

Ninety percent of households participated. Householders were given kitchen tidy bins, called 'bio- bins', and 85 litre bins for the kerbside or 240 litre if living in multi unit complexes. The average tonnage collected weekly over the ten- month period was 3.7 tonnes (4.3kg per household).

'Trash pack' operators (garden waste/organics/mixed rubbish collection service offered by some local companies to residents) were concerned at the start that the service many impact on their businesses. Therefore audits were carried out at seasonal intervals on residual garbage bins, bio bins and trash packs.

Processing – the desired outcome was to compost material which could be used as a garden product that complied with Australian Standard 4454 – 1999. The collected material was decontaminated, shredded, mixed with shredded green waste and then windrowed for 20 weeks. The finished product was of high quality containing higher N:P:K levels than general composted green waste.

For the full report or more details on this trial go to [www.act.gov.au/nowaste](http://www.act.gov.au/nowaste) or email [no.waste@act.gov.au](mailto:no.waste@act.gov.au). The report contains many educational examples that may be of interest.

### **Kimbriki, North Sydney**

The Kimbriki Landfill in North Sydney prohibits the depositing of food/ putrescible waste and animal waste. This is enforced with by- laws and fines of \$250,000 for businesses and \$120,000 for individuals found dumping food waste there. At the entrance to the Landfill beside the recycling drop off area is an Eco Garden demonstration site with home composters and worm farms on show to visitors and showing ways to utilise food/ putrescible waste at home to grow organic food crops.

Contact Peter Rutherford, Kimbriki Eco Garden at [earthsolutions@ozemail.com.au](mailto:earthsolutions@ozemail.com.au)

### **Kimbriki demonstration eco- garden**



## USA

In 1997, 21.9 million tonnes of food waste was generated in the USA yet only 2.6% of this was recovered. In the last decade however, new initiatives have proven successful in recovering more food and converting it into valuable end uses. Kerbside collection is growing in popularity. Most of these programmes focus on the commercial and institutional sectors but some are now tapping the residential sector. Food recovery programmes are operating in San Francisco, Berkeley and Santa Cruz.

(Ref. Food Recovery: Turning Waste into Meals, Soap and Black Gold, Brenda Platt, Institute of Local Self Reliance. This report is available either from the Zero Waste New Zealand Trust office or on-line at <http://www.ciwmb.ca.gov/Publications/default.asp?pubid=938>)

### San Francisco

San Francisco is one of the largest cities in the USA, with a high population density, a diverse cultural mix and a waste stream consisting of about 20% food scraps. The introduction of a three-stream sort program, led to 40,000 tonnes per year of food residuals and other compostables being diverted from landfill. The three cart colour coded programme was introduced in February 2000 after a two and a half year pilot period.

The program was developed and expanded as collaboration between the City and Norcal Waste Systems.

Each household and business in this program is provided with three different wheeled carts. A green cart for compostables (yard trimmings, food scraps and soiled paper), a blue cart for recyclables (paper, bottles and cans) and a black cart for all remaining trash. A smaller container is also provided for the collection of kitchen scraps. Participation in the use of the green and blue carts is voluntary. Residents are only paying for the black cart service and charges are based on volume, thereby providing incentive to reduce waste and/or use the other bins. Business are, however, charged for their compost collection, but it is at a discounted rate of 25% off the normal heavy garbage rates.

The organics are delivered to the city's transfer stations and then hauled in large trailers to a composting facility. The finished product is sold to the landscape and agricultural markets where it is being used by organic farmers, in highway erosion control projects and sold in retail outlets.

Public support for this service has been very high, with statistics showing over 80% of the residents prefer the three-cart system to their old collection service. Commercial sectors have also been enthusiastic towards adopting the program and there are numerous awards available for business achieving significant results.

Benefits include a 45% reduction in waste going to landfill on the new system routes. The wheeled carts are being seen as safer and more convenient than the old non-wheeled trashcans. The lidded carts mean there has been reduced litter and scavenging. The collection process itself is also becoming increasingly efficient as a result of specially modified collection trucks and new collection routes.

To achieve high participation and low contamination, an intense public education campaign was carried out. These included mail outs and customer service hotlines in a variety of different languages, to inform and ease initial confusion. Issues surrounding space have needed to be worked through, as the three carts should be stored within the properties of the residents and businesses. Set-up costs included the production of the carts, new collection trucks and the education services mentioned above.

The city has set an achievable goal for the near future. It has been estimated that annual landfill tonnage will be reduced by over 50% by 2003. The program has achieved significant

results and has gained much recognition and interest. In the author's words, it is a "viable model for communities around the Bay Area, across the continent and beyond."

(Ref. Biocycle Magazine, February 2002, Jack Macy, Organics Recycling Coordinator for the City and County of San Francisco Department of the Environment.)

## **CANADA**

### **Nova Scotia**

Compostable organics are banned from disposal in Nova Scotia. Halifax has increased diversion rates from 3% to 60% since 1997 through implementing systems including organics recovery. The decision made by the council that no organic waste should go to landfill led to the implementation of a three stream kerbside collection system with all households.

Seventy two percent of householders have access to a kerbside organics collection. Special aerated wheeled bins are provided for the collection of organics and a home composting programme has been enforced. These bins are collected fortnightly and taken to one of two large composting facilities.

Main improvements sought locally have been to install smaller local composting facilities especially in rural areas where farmers operate these facilities themselves. Not only have 3,000 jobs been created, but in Halifax, the landfill has now been stabilised with the removal of the organic fraction – there are no odours or birds circling (which is a common sight at landfill sites containing mixed waste). Only Halifax among municipalities in Nova Scotia processes its remaining waste (after source separation of organics) so virtually no putrescible organics are landfilled.

(Ref. 'Beyond 50% - Halifax=S Successful Integrated Waste Management System' by Fred Wendt. This paper was presented at SWANA's 4th symposium held in Chicago, USA, in 2000 and can be reprinted with the permission of the Solid Waste Association of North America. Go to [www.swana.org](http://www.swana.org) or also available from the Zero Waste New Zealand Trust office.)

Also check out Canada Organics Collection – [www.region.halifax.ns.ca](http://www.region.halifax.ns.ca) and Target Zero Canada - [www.targetzerocanada.org](http://www.targetzerocanada.org).

The Zero Waste New Zealand Trust office also has copies of a video narrated and produced by Dr Paul Connett called 'On the road to zero waste – Part 1, Nova Scotia: community responsibility in action'. Cost - \$14 including postage.

### **Spruce Grove, Alberta**

A full kerbside organics collection programme was established in Spruce Grove, Alberta for all 4,597 households. Each house is provided with a 245 litre plastic cart for source-separated organics (kitchen and garden). The organics are collected and taken to a commercial composting facility. An intense public education and communication programme has been developed and has led to high participation and low contamination rates. The establishment of a Hotline service ensures public support is maintained. The composting site has diverted 13,000 tonnes organic residuals in the year up to October 2001.

(Ref. Biocycle, P.27, January 2002. Available from the Zero Waste New Zealand Trust office.)

## Further reports, articles and information available from the Zero Waste New Zealand Trust office:

- High Diversion, The Italian Way – Resource Magazine, March 2002
- Biocycle, February 2002, San Francisco Food Waste Recovery
- ACT, Chifley Household Organic Material Collection trial Report
- European Environment Agency, Biodegradable municipal waste management in Europe
- Curbside Recycling, the next generation – Gary Liss (not available for reproduction)
- Food Recovery: Turning Waste into Meals, Soap, and Black Gold – Brenda Platt. Case study profiling the food recovery efforts taking place in San Francisco, Berkeley and Santa Cruz, USA.
- Recycling Works, case studies of organics recovery programmes in Europe, the UK and USA – Friends of the Earth and Community Recycling Network
  - o Earth Works municipal composting programme, Ontario, Canada
  - o Newark & Sherwood DC, UK
  - o Composting in St Edmundsbury, UK
  - o Anaerobic digestion, Brecht, Belgium
  - o Aerobic windrows, St Thomas, Canada
- 'Zero Waste' by Robin Murray. Published by Greenpeace Environmental Trust, February 2002. Available from the Zero Waste New Zealand Trust office for \$40.
- Beyond 50% - Halifax=S Successful Integrated Waste Management System, Fred Wendt
- Institute for Local Self Reliance (non profit research and educational organisation that provides technical assistance and information on environmentally sound economic strategies)– list of publications also available from [www.ilsr.com](http://www.ilsr.com)
- Californian Integrated Waste Management Board (responsible for managing California's solid waste stream) publications – [www.ciwmb.ca.gov](http://www.ciwmb.ca.gov)
- Christchurch City Council Educational Material
- Gent, Flanders, Belgium – Hogg et al 2002 'Towards Sustainable Waste Management Practice – Case Study report' (SNIFFER – Scotland and Northern Ireland fund for Environmental Research) Project SR (02) OSB April 2002 (not available for reproduction)

## Website links

### New Zealand

Ministry for the Environment – [www.mfe.govt.nz](http://www.mfe.govt.nz)

Meritec Ltd (consultants)– [www.meritec.org](http://www.meritec.org)

Landcare Research – [www.LandcareResearch.co.nz](http://www.LandcareResearch.co.nz)

Living Earth Ltd – [www.livingearth.co.nz](http://www.livingearth.co.nz)

Bio- Gro – [www.bio-gro.co.nz](http://www.bio-gro.co.nz)

The Compost Resource Page – [www.oldgrowth.org/compost](http://www.oldgrowth.org/compost)

Information on composting methods and products – [www.mastercomposter.com](http://www.mastercomposter.com)

Worm Farming – [www.any.co.nz/worms](http://www.any.co.nz/worms), The Burrow; Everything you need to know about worms - <http://gnv.fdt.net/~windle/>

New Zealand Earthworm Association – Derek Barrett Boyes at [Pavarotti@worms.pl.net](mailto:Pavarotti@worms.pl.net)

VCU Technology – [www.vcutechtechnology.com](http://www.vcutechtechnology.com)

HotRot – [www.hotrotsystems.com](http://www.hotrotsystems.com)

### Canada

Composting Council of Canada – [www.compost.org](http://www.compost.org)

Canada Organics Collection – [www.region.halifax.ns.ca](http://www.region.halifax.ns.ca)

Target Zero Canada - [www.targetzerocanada.org](http://www.targetzerocanada.org)

Nova Scotia – [www.gov.ns.ca/envi/wasteman/index.htm](http://www.gov.ns.ca/envi/wasteman/index.htm)

### Australia

Australian Worm Growers Association – [www.dragnet.com.au/~lindah/awga/Sep98](http://www.dragnet.com.au/~lindah/awga/Sep98)

Australian Capital Territory Government, [www.act.gov.au/nowaste](http://www.act.gov.au/nowaste)

## **UK**

Community Recycling Network – [www.crn.org.uk](http://www.crn.org.uk)

Community Composting Network – [www.othas.org.uk/ccn/index](http://www.othas.org.uk/ccn/index)

The Composting Association (a membership organisation that researches and promotes best practice in composting and the uses of compost– [www.compost.org.uk/](http://www.compost.org.uk/)

Henry Doubleday Research Association Consultants – committed to researching and providing advice on composting as a sustainable solution to organic waste management– [www.compost-uk.org.uk/](http://www.compost-uk.org.uk/)

The Centre for Alternative Technology (europe's leading eco- centre) – [www.cat.org.uk](http://www.cat.org.uk)

## **Europe**

European Environment Agency – [www.eea.eu.int](http://www.eea.eu.int)

### **Contact Zero Waste New Zealand Trust at:**

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