

AT THE COAL FACE: TRYING TO TURN WASTES INTO RESOURCES

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1. INTRODUCTION

"When we throw a product away, it represents much more than just a piece of waste. It also embodies all the resources used to produce it. If you add them all in, the real weight of a toothbrush becomes 1.5kg and that of a mobile phone 75kg!"

[EU Environment Commissioner Margot Wallstrom in launching the EU's 'Towards a Thematic Strategy on Waste Prevention & Recycling', 2003]

Homo sapiens have to date been extraordinary generators of waste; materials unwanted and thrown away. A few statistics might help to set the scene.

In the European Union every man woman and child creates about 3.5 tonnes of waste per year. Between 1990 and 1995 the amount of waste generated in that part of the world increased by 10%. The OECD estimates that by 2020 Europeans could be generating 45% more waste than they did in 1995. However, some European countries are recycling significant amounts of household waste, for example 50% in Germany and 47% in the Netherlands.

In the United Kingdom the quantity of household waste is rising by 3% per year; faster than GDP and faster than most other countries. The UK recycles just 12% of its household waste.

In the United States of America, over the past decade total waste volumes have increased whereas the per capita figure has levelled off sharply. Over the same time period the overall waste recycling rate has risen sharply, doubling to 15%.

New Zealanders generate approximately seven million tonnes of waste per year that is disposed to landfill or to cleanfill sites (for construction and demolitions waste). Aside from disposal, recycling has saved some materials, for example 70% of aluminium cans, 50% of waste paper, 47% of green waste, 31% of steel cans and 18% of plastics.

Clearly, there is a pattern of ever increasing material consumption and this rate of consumption is not ecologically sustainable. It is eroding the Earth's natural capital that humanity needs for survival.

Waste is only a waste and not a resource because traditionally we have deemed it more profitable to throw it away rather than recover. Because waste has been seen as a low price item, excessive quantities are often generated via inefficient production methods, goods are often of poor durability and we consume in a wasteful manner.

However, slowly but surely, things are changing.

In the USA the waste recycling industry is now worth US\$240billion, and is the same size as the automobile manufacturing industry and is significantly larger than the waste disposal industry. However, whilst recycling percentages have more than doubled in the last decade, waste disposal tonnages have remained constant.

Resource recovery is also big business in New Zealand. In 1998, the recycling industry in Auckland alone was estimated to employ 2,000 people and have a gross annual turnover

of at least \$132 million. In 2001, the recycling industry generated \$100 million in export earnings, not much less than that of the flourishing wine industry.

As at July 03, there were only five councils in the South Island that had not signed up to the concept of zero waste. [*Zero Waste Update, July 2003*].

The balance of this paper goes on to outline some of the activities of Waste Management NZ Ltd and reflects on the challenges posed for a waste management company by the increased attention on recovering resources from waste for beneficial re-use.

In New Zealand, Waste Management NZ Ltd (WAM) collects and transports approximately one million tonnes of household and commercial wastes. WAM has over 20 branches throughout the country, directly employs nearly 800 people and owns 50% of Living Earth Ltd, a composting business. It owns, in full or in part, three landfills and has a share in the proposed Kate Valley landfill at Canterbury. It also has liquid waste operations in Australia and landfill-gas-to-energy (LFGTE) projects in New Zealand and China.

2. ORGANISATIONAL CULTURE AND ACTIONS

WAM has been in the waste business for nearly 40 years. The pressures and constraints on the company today are somewhat different from the early years. In the beginning, it was end-of-pipe solutions, lax regulatory environmental standards and a no frills approach. In the 1990's the focus was on higher landfill standards. The industry is now in quite a state of flux and faces a new agenda of alternative waste management technologies, waste minimisation, resource recovery and the murky and ill-defined concept of 'sustainable development'. Changed societal expectations also now demand environmental reporting and information dissemination beyond the walls of the company.

These new circumstances have required changes in the culture of the organisation and the way it operates. Attitudinal and behavioural changes have and are occurring, not only to respond to the immediate circumstances but also to try and predict the future. Nowadays environmental goals occupy a pivotal place within the basic values and beliefs of the organisation. The structure of the company has been changed in recent times to reflect the shared values and to drive implementation of the corporate goals, including LFGTE and materials recovery.

Mindful of the needs of our shareholders, clients, the regulators and the wider community, WAM has pursued a number of initiatives that now sees the organisation more responsive to the eco-efficiency agenda. These include the following:

1. Encouragement of new ideas leading to innovation, creativity and experimentation to create new possibilities in a changing industry;
2. A reworking of the environment policy;
3. Changes to the structure of the organisation to give better traction to that policy;

4. Monthly reports to the Board on environmental performance and current and future issues;
5. Identifying and tracking key environmental performance indicators. These include all the different types of materials collected via kerbside and the commercial sector, and identifying whether recovered for beneficial re-use or disposed to landfill;
6. Reporting on environmental and social performance as part of our annual public reporting process;
7. Participating in the activities of the New Zealand Business Council for Sustainable Development, including the projects 'The Industry Guide to Zero Waste' (2002) and 'Economic Incentives for Sustainable Development' (2003); and
8. Provision of waste audit and recycling services, along with the traditional waste collection services. The benefits of this approach tend to be twofold; waste is diverted from landfill for beneficial re-use and the clients waste costs are reduced, often in the order of 20%. By way of examples, an office recycling programme for a business with nearly 1,000 employees was devised and implemented recently, and a waste and recycling audit for a national food chain has identified significant opportunities for cost savings.

The rate of change tends to be gradual because, whilst the company needs to be showing leadership in resource recovery, it also needs to remain pragmatic and realistic about what is feasible in an operational sense and sustainable from an economic standpoint. It is important to recognise that WAM is only a service provider. It does not generate the waste in the first place nor is it solely responsible for the price of management, nor whether it goes to final rest or is re-used. Politicians, environmental regulators, industry and commerce, all of us as consumers, and the waste management industry all need to work together more closely if the overall levels of eco-efficiency are to improve and by definition society is to adopt improved ways of managing used materials.

The approach and focus of the financial markets also tends to be a disincentive to the adoption of substantial innovation and experimentation. The markets seem to reward predictability and consistency and appear much less interested in how the company will be performing 10 or 20 years out. Such longer term thinking is of course essential if we as a species are to embrace lifestyles that are sustainable in the longer term.

3. EXAMPLES OF TURNING WASTES INTO RESOURCES

WAM has been pursuing resource recovery initiatives for a number of years and continues to look for new opportunities to do more, both in NZ and Australia. In 2002, approximately 170,000 tonnes of paper, glass, green waste, metal, wood, clean soil and other recyclables were collected by WAM for re-use. This was a 50% increase on the previous year.

Listed below are just a few examples of what is being done via kerbside recycling and via specialist services offered to commercial and industrial clients.

3.1 Kerbside Recycling Collection

Householders have taken to kerbside recycling with great enthusiasm and it has proven to be a positive initiative in the drive to recover resources. One example of what can be achieved is the result for Hamilton City Council where, in the first full year of a kerbside recycling contract, over 7,000 tonnes of materials were collected and processed from more than 45,000 households. By weight, paper represented 62%, glass 30% and plastics 7% of the collection. This material is beneficially used by various recyclers. The independent residential survey revealed a Customer Satisfaction Index of 81.4 for the service for the first year (above 75 is deemed excellent).

3.2 Living Earth Ltd

Living Earth conducts composting operations in Auckland, Wellington and Christchurch and markets the product throughout New Zealand. The company is a 50:50 joint venture between WAM and Forte Investments Ltd.

It currently transforms a variety of green organics, abattoir waste and sewage biosolids into high quality compost. Approximately 80,000 tonnes of compost was produced in 2002.

With approximately 50% of the municipal solid waste (MSW) being organic, there is huge scope to capture and beneficially re-use even more material, so long as there is a viable market for the product. Living Earth has traditionally priced its organic waste drop off fee at around 60% of the MSW fee to provide sufficient incentive for waste generators to separate. Living Earth's capability therefore to increase production and invest in capital expansion is directly governed by prevailing landfill pricing. Currently, landfill pricing does not establish the certainty required for major investment.

The company's activities have also generated spin-off benefits such as the emergence of an estimated \$3 million green waste collection sector in Auckland.

3.3 Paper/Kraft

- a) WAM has a partnership with Fullcircle (Carter Holt Harvey) throughout New Zealand to optimise the collection, recovery and reprocessing of industrial kraft, cardboard and waste paper. Cardboard from both industrial and domestic collections is reprocessed into new liner boards and fully recycled medium board for use in packaging applications. Significant amounts of waste paper are also recycled from commercial and industrial premises.

3.4 Glass

- a) In Christchurch and Auckland, commercial volumes of broken window glass are collected for use by third parties in the manufacture of fibreglass insulation.
- b) Laminated glass waste in Auckland is collected and ground up by a third party for use as an aggregate.

- c) In Auckland and Christchurch a specialist service collects glass from bars and restaurants. This material is used by another company in the manufacture of new glass containers.

3.5 Wood/Green Waste/Animal Wastes

- a) In Christchurch, waste fibreboard (such as MDF) is collected and used by a third party as an alternative fuel source.
- b) In Auckland, coconut fibre is collected for use by Living Earth.
- d) In Wellington, Living Earth's enclosed composting facility has provided an outlet for recovery of the following wastes:
 - abattoir wastes;
 - tobacco that does not meet manufacturing quality specifications;
 - residential and council green waste; and
 - sewage sludge.
- e) In Auckland, broken wood pallets are collected and delivered to a third party where they are chipped, coloured and sold as garden landscaping material.
- f) In Christchurch, residential green waste is collected for use in composting.

3.6 Food/Other Organics

- a) Commercial food waste is being collected and used on prison pig farms in Hastings and Christchurch.
- b) Trials are being conducted in Australia with a major grocery chain to find beneficial uses for vegetable and bakery waste. Issues include:
 - staff training in new procedures
 - establishment of a sorting facility to remove packaging contamination
 - finding an outlet in the stockfeed manufacturing industry
- c) In Australia trials are being conducted on the use of grape marc (grape seeds and skins). Given the high protein content of the material it shows potential as an additive in the manufacture of stockfeed.

3.7 Metals

- a) In New Zealand WAM has a close association with Sims Pacific Metals to optimise the collection and recovery of scrap steel. Some other metals are collected and provided to other specialist recyclers.

3.8 Plastics

- a) In various locations throughout New Zealand a variety of plastics including high and low grade cling wrap plastics and soft plastic bags are collected for use by third

parties in plastics remanufacturing. Some of this material is also baled and exported, for use as raw material in plastics manufacturing.

3.9 Industrial Wastes

a) ***Foundry Sand***

Typically waste foundry sand has been disposed to landfill. In Australia WAM has organised for a potting mix manufacturer to use this material as a bulking agent. The dark colour of the sand also enhances the appeal of the final product to the market. All appropriate environmental assessments were conducted on the waste sand beforehand and as a result the operator modified the production process to eliminate any contamination of the sand.

b) ***Contaminated Bulkabags***

Certain chemically contaminated bulkabags have had no disposal route in Australia and have had to be placed in long term storage.

WAM has been working with the waste generator to devise a solution. The bags are large with an interwoven plastic liner. One option being trialled is to cut up the bags using a specially designed machine to enable the contaminants to be treated. It is planned that the bag remnants will be recycled.

c) ***Lime Slurry***

Lime slurry from the petrochemical industry has typically been landfilled. In Australia WAM is conducting trials with a view to modifying the material to enable it to be used as a stabilising material.

d) ***Urea Resins***

Various urea wastes from a chemical manufacturer are being trialled as an additive in the manufacture of compost in Australia.

e) ***Commercial and Industrial Wastes***

Our waste collection and transport divisions have developed a resource recovery strategy and an aim to divert even more materials from landfill. In Auckland, WAM sorts construction and demolition material it collects, resulting in 70% either recovered or redirected to cleanfill with the remaining 30% disposed to landfill. The Christchurch operation runs a similar sorting facility.

3.10 Landfill Gas

To date four, one megawatt generators have been installed at Redvale and Whitford landfills (Auckland) to utilise this energy source and more are planned. This energy is enough to provide power to 2,800 homes, or about 7,000 people. At Redvale the gas is also used to evaporate leachate. WAM has sold the resultant greenhouse gas emission credits on the international market.

4. CONCLUSION: HOW CAN WE DO IT BETTER

There is considerable sentiment within our society to manage our wastes better and to prevent their generation if possible. The challenge now is to translate this desire into tangible actions on the ground.

By definition, what is being contemplated is a significant change to the status quo. Listed below are some suggestions as to what needs to be done to achieve the new paradigm in New Zealand.

- a) The signals sent by the current economic system tell us that waste is cheap and inexpensive to deal with; that it is best managed by simply burying or tipping down the drain. We urgently need to adopt the use of economic indicators that 'internalise' non-market environmental values. The use of GDP as an overall measure of 'wealth' is misleading and unhelpful in this regard as it does not take account of the costs to the environment of generating the wealth.

To illustrate the point, whilst global Gross Domestic Product (GDP) doubled in the twenty five years to 1995, the Earth lost one third of its natural capital as measured by the health of its forests, freshwater and marine eco-systems over the same period. In the OECD, a 40% increase in GDP since 1980 has been matched by an identical increase in municipal solid waste (MSW).

- b) In our market economy, decisions involving which resources we use, what we use them for, how efficiently we use them, and ultimately how they become a waste, are primarily driven by economic forces. Thus we need economic incentives that promote waste minimisation and resource recovery. This means the prices of certain goods and services (including waste management services) need to incorporate an environmental cost. We as consumers will then better understand the links between our own actions and the environmental and social consequences and the need to consume differently. Only then will waste generation be decoupled from economic growth.
- c) Greater courage, vision and leadership needs to be shown by our politicians so that they acknowledge by their actions the need to rein in per capita resource consumption and to provide choices regarding resource recovery. The biggest hurdle to bringing this to fruition is the short time frame of government terms in office and the need for support from voters. The decisions required may be unpalatable in the short term but the medicine is absolutely necessary if we want a healthy planet on which to live. The plastic bag levy in Ireland that triggered a 90% reduction in the consumption of bags only came about because of the passionate views held by the new Environment Minister.
- d) The 'waste' versus 'non-waste' construct embedded in the current regulatory system needs to be changed so that materials now considered wastes would be presumed, wherever possible, to be commodities with valuable, potential uses. This would result in a change to 'materials management', rather than 'waste management'. One approach would be to identify materials as 'wastes' only when their useful life is expended and they are clearly destined for disposal. Until then, all potentially hazardous materials would be subject to management controls and incentives based on

their risk potential rather than on designation as a waste. Reducing the distinctions between wastes and materials will significantly improve recycling and re-use rates.

- e) Build on the NZ Waste Strategy. The Strategy was a commendable start but it needs to be given more teeth and a greater sense of urgency. The move by the Ministry for the Environment to establish a range of national standards relating to waste is welcomed. Rigorous yet pragmatic standards will facilitate greater recovery of materials for beneficial re-use, for example the application of biosolids to land.
- f) Because wastes are deemed to be of negative value to those who generate them, there is a clear incentive to dispose of them as inexpensively as possible. Rigorous regulatory standards for waste management facilities are therefore essential to protect the environment. The current national standards in this regard are often inadequate, though enforcement is improving. Those companies that do have an environmental conscience and have built environmentally sound facilities are operating at a distinct financial disadvantage whilst second rate facilities continue to offer cheaper gate rates, leaving the environment to carry the cost.
- g) Government assistance is needed to facilitate development of recycling and resource recovery infrastructure and encourage innovation. Incentives in the form of taxation benefits, government loans and a robust research and development programme with clear objectives and transparent reporting of outcomes are required. This should address such matters as product eco-design, the quality and quantity of feedstock provided to alternative waste technologies, and reliable markets for recyclables.
- h) Central and local government should provide leadership via the public tender process by placing increased emphasis on environmental and social sustainability criteria and less on the short term economics. Governments should specify the level of environmental performance required, for instance on GHG emissions, energy efficiency, resource recovery rates, etc.

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