

Zero Waste – the End of Waste?

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Introduction

Distrust in the methods of waste management promoted by the global waste industry is growing around the world. New landfills and incinerators are becoming increasingly difficult to site as communities mobilise to appose not only the facilities themselves but also the science and thinking upon which they are based.

There seems to be two ideological approaches to waste. One sees waste as inevitable and to be got rid of – and an enormous industry has grown up around the idea that we can just keep building bigger and better systems to deal with it and take it all away. Landfilling and incineration fall into this ‘end of pipe thinking’ and sometimes so does recycling.

The second says that waste shouldn't exist - that we should design a new industrial system, with no waste outputs - that responsibility for eliminating waste should start right at the point of design and then be passed on via a chain of custody that manages the whole life cycle of materials and products.

A new catchcry for solving the waste crisis is emerging throughout the world in response to the current failure of resource management – Zero Waste!

Battles in a War on Waste

Battles over waste are becoming battles for local control of resources and decision-making, and neatly parallel the battle between the forces for globalisation and for want of a better word, those of ‘localisation’. On the one side we have the global corporate driven ideology attempting to prove that it can feed everyone and create wealth for all by driving the industrial system harder and faster. On the other side we have a self emerging informal network of people and organisations who want local production, sustainable agriculture, reduced consumption and a return to the values and security of community.

Waste is the main output of the human industrial system – its consequences are amplified by our unsustainable patterns of production and consumption. In spite of all the talk about sustainability and resource productivity, waste continues to rise worldwide. Many companies have improved the efficiency of their internal

processes, largely because they see waste as lost profit, but have done little about their overall product waste which is left for communities to deal with – and sustainability has become a corporate marketing tool for “business as usual”. Zero Waste questions who has the right to be in control of waste resource flows and challenges our right to continue trashing the world.

The Problem with Landfills and Incinerators

There is increasing evidence that landfills are a far greater menace to human health and the environment than most people would believe. One study shows that leachate will be a problem well past the term of most after care contracts [1], and The USEPA has stated that even the best landfill liner and collection system will ultimately fail due to natural deterioration and that they simply delay releases into the environment [2]. A US engineering consultant, goes even further by claiming that landfill leachate will remain a danger to groundwater for thousands of years and that once groundwater is contaminated, it cannot be cleaned up and must be considered permanently destroyed [3]. Recent studies link landfills to various health problems in women and unborn children living in close proximity to landfills [4].

The reality is that in this high tech era we are still using a midden technology to get rid of our waste. Landfills are human constructs that destroy land, resources and jobs and create long term liabilities for communities. Long after the original builders are dead, their toxic legacies will remain for thousands of years.

There is also growing concern at the dangers of incineration and the levels of dioxins and other toxins emitted, as well as the issue of residual material of up to 30% that still needs to be landfilled.

The fact is that no-one really loves a landfill or an incinerator – they are simply dirty sinks for societies mixed up discarded materials and toxins. Measured by the efficiency and level playing field criterion so vaunted by business these days they fail, because they provide an unfair subsidy on inefficient and dirty manufacturers. Clean manufacturers who make products that can be reintegrated productively back into the economy or harmlessly into the environment have internalised the costs of disposal into their product and do not receive the benefit of free dumping that dirty manufacturers do when the community or end user finally sends it to a landfill or incinerator.

Growing public concern about these technologies has driven a quest to make them safer; but without challenging the basic assumptions they are built on – that waste is inevitable, that it has no value, and that it can be made to ‘go away’. In response to these concerns the waste industry has gone to great trouble to protect the status quo – to prove one way or another that their ‘burn or

bury' technologies are safe. The arrival of Zero Waste as a vision for a sustainable society challenges these old technologies and the status quo with a single proposition – we must aim for no waste!

The Essence of Zero Waste

Zero Waste is a 'whole-system' approach to redesigning modern society's unsustainable resource flows. Zero Waste encompasses waste elimination at source through product design and producer responsibility, as well as waste reduction strategies further down the supply chain such as cleaner production, product dismantling, recycling, re-use and composting.

Unlike landfills and incinerators, Zero Waste is not a single 'one-size-fits-all' solution to waste. It's simply a name for a basket of technologies and behaviours that were previously promoted individually as separate tools for reducing waste. Zero Waste unifies disparate ideas and technologies into one easily understood "call to action" and goes far beyond recycling in its reach and impact. Zero Waste popularises an otherwise complex range of issues, which up until now were dominated by a largely hidden but significant industry that has quietly worked to "hide" the waste outputs of the current industrial system. The waste 'hiding' mentality has indirectly enabled inefficiencies to mount within industry, business and society – and has transferred long term costs to future generations.

Zero Waste is like a wooden horse for the current industrial economy – using the language of efficiency it is welcomed into the heart of the system whilst at the same time challenging the very thinking on which the system is based.

Many Zero Waste proponents go even further to ask "why are we making so much stuff in the first place? Why are we basing our sense of wellbeing on material things – things that deplete the resource base of the earth and then end up in landfills and incinerators? A simplicity movement is emerging in the western world in an attempt to reclaim the values of community and to move away from the idea of having more and more stuff to satisfy our need to belong. They see waste as a signal that the current system based on consumerism, driven ever forward by marketers who see people only as demographic phenomena, has failed. They don't want to be seen simply as consumers driven to buy and use up more and more.

There are many constituencies rallying around the idea of Zero Waste as a key driver for change in an area where change has been resisted for too long. Waste issues are becoming popularised, and increasingly everyone's business. These days, people don't believe "leave it to us - we're the experts". They want to know more – they are concerned about the effects of hazardous wastes, about

the dangers of landfills and incinerators. They want to see waste recovered, recycled, reintegrated or not made in the first place. .

Zero Waste proponents see waste as firstly a social problem not a technical one. We have for two long asked technicians to solve the huge problem of waste as if it was an isolated technical issue - but now we need a single clear vision that integrates the complex range of social and technical – before it's too late.

The Battle for Resources

The battle for resources is playing out in many communities right around the world. The waste that goes to landfill has become enormously valuable over the last 50 years and many communities are implementing programmes to create local jobs and business opportunities from waste. The Community Recycling Network in the UK for example has over 200 member groups that are in some way providing waste reduction or education services in their communities. Collectively this network of small and some large social enterprises are among the largest providers of recycling services in the UK, providing a weekly recycling service to 1.6 million households.

A recent study in the EU suggests that the recycling industry with a return on investment of around 2% is a poor cousin to landfill with 17%, and incineration with around 13%. In spite of the poor returns and against the odds, the recycling industry is growing at a phenomenal rate throughout Europe and the US – in Ohio alone already a \$US22.5 billion success story [5]. A recent report by Beck and Co for the National Recycling Coalition in the USA shows that recycling is a \$US258 billion industry employing over one million people and numerous other studies highlight the economic development potential of reuse, recycling and manufacturing from recovered materials.

In New Zealand over 40 local groups are providing recycling services to their communities. These include providing weekly kerbside collections, operating composting programmes and resource recovery centres and providing education outreach to schools and the community. Many of these groups are winning mainstream waste contracts and using the profits to fund their social objectives. The groups are building local capacity and ownership and winning control of resources for community benefit. The job outcomes are significant.

Community Enterprises tend to follow the 5 Ls; Low tech, low cost, low impact, locally owned and local benefit – quite the opposite to the high tech capital intensive solutions that are often preferred by the waste industry which often needs to lock in 'flow control' contracts to ensure a return on investment.

Getting to Zero Waste

Critics of Zero Waste often point out that we shouldn't aim for something that we can never achieve - that we should set "realistic" targets and to do otherwise is foolish and misleading. But if we focus totally on Zero, we have missed the point. It's not actually about whether we can or cannot actually get to Zero - it's about thinking and managing the way resources flow through society in a totally new way. The real power of a simple and challenging target like Zero Waste is that it creates a new framework and impetus for people to think and behave differently. Once an organization or community sets Zero as the target – the compass is set – there is no ambiguity! They can no longer simply aim for just 50% or 95% - these are fine but only as intermediate targets. The simple act of setting a target of Zero and a date within which to achieve it is enormously empowering and enables people to achieve far greater results than first thought possible. If we agree we need rapid change then we need just the opposite of realistic targets. We need unrealistic, audacious, impossible targets - like Zero Waste.

The New Zealand story

A national campaign to eliminate waste is being coordinated by Zero Waste New Zealand with the support of a network of local community organisations, businesses and institutions. Nearly half of all 74 local authorities have adopted official targets of Zero Waste - most by 2015 [6]. As a result of the campaign the New Zealand government have given their new national waste strategy the title 'Towards Zero Waste and A Sustainable New Zealand. A number of large businesses, a Government Department and the largest university have adopted Zero Waste policies and the idea is beginning to take hold within the healthcare and tourism sectors. Even Parliament Buildings are also developing a zero waste policy. Zero Waste has changed the emphasis of some local authority waste management plans. The creativity of engineers and waste managers is inspiring to say the least when given the freedom to innovate. Resources that were previously being spent on traditional waste systems are beginning to be invested in resource recovery systems. A number of municipalities have built new resource recovery centres and more are being built.

The campaign is attracting considerable attention from around the world and is considered a powerful way to protect the premium that New Zealand gains from its tourism and agricultural exports and "clean green" image. The campaign deliberately plays on previous firsts. New Zealand was the first country to give women the vote and the first to adopt a national anti-nuclear policy. For the latest updates on the campaign for a Zero Waste New Zealand please visit:

www.zerowaste.co.nz

Designing Waste Away

Zero Waste is a big picture idea – a vision – not a single strategy or technology. It embraces many concepts such as Industrial Ecology where businesses feed off each other's waste and Cleaner Production where manufacturing processes are redesigned to eliminate waste. It includes environmental education in schools and universities and community recycling programmes utilising previously unemployed people. It includes Resource Recovery Parks or Discard Management Centres, which are springing up all around the world to create opportunities for local business development and employment through utilisation of discarded materials. It includes everyone doing their bit in every aspect of their daily lives.

Above all, Zero Waste is a design principle. A number of businesses, design groups and think tanks around the world are working on ways to design waste completely out of the production chain.⁸ Design for Environment concepts are already being integrated into products and packaging and are the first signs of what is to come and the changing nature of future waste streams. There is talk now of products being made with certain adhesives that will collapse under microwave – others that will be designed to be pulled to bits in minutes with a simple combination of purpose built tools. Instead of making it easier and cheaper to get rid of wasted resources, Zero Waste unleashes the innovation and creativity needed to integrate the human economy into the natural economy – as such zero waste is a key driver for sustainability.

What a Zero Waste Society will Look Like

Let's imagine that it's now the year 2020 – our Zero Waste target was set in the year 2002. The first thing we will notice is that there will be no weekly rubbish collection, as we know it. Instead there will be regular collection of recycling commodities; household bulky items and kitchen waste with say a monthly collection of residual material. Sophisticated odour free methods for composting at home will be practised by those with sufficient space. Apartment and multi occupant buildings will have in-built recovery systems. Garden centres will promote landscaping methods that reduce garden waste. In-vessel composting systems will be placed amongst clusters of restaurants and supermarkets and turn a profit for the owners from the sale of high quality compost. Farmers will become involved with and invest in systems for returning high quality compost to the land to ensure their ability to produce fine natural food without loss of soil structure and fertility.

Each country will have a network of branded drop-off and re-use centres that will be as easy to identify and as high profile as gas stations. Some will operate as chains and some as “independents”. They will trade with each other as well as feeding used materials and goods into purpose built Resource Recovery

Parks or directly into second hand dealers networks. All of these centres and parks will be licensed and partly funded through Advance Resource Recovery Fees (previously called Advance Disposal Fees). A myriad of recycling, remanufacturing, processing, and disassembly businesses will be based at and around these centres. Many of the businesses will have got their start from loans provided by dedicated recycling loan funds, as well as through land being made available in “Recycling Market Development Zones” with special tax incentives. The businesses will also have received technical advice from a range of advisors specialising in all aspects of Zero Waste technologies and systems. Many of the people running the various recycling and remanufacturing businesses will have attended one of the Zero Waste Academies or Institutes that will have been set up from 2002. At the supermarket there will be almost no packaging, as we now see it – many bottles will be returned for refilling and often refilled at the store for a considerable discount that includes a refund of the Advanced Recovery Fee. Most packaging will be compostable or infinitely recyclable and much will be reusable.

There will be a reverse logistics systems for all vehicles, appliances and electronic goods. Retailers will also have their own reverse logistics systems, resulting in intense competition for discarded products and materials. Most products will be designed for disassembly and local recyclers will bid for franchises to dismantle products for various manufacturers. All products will be made in ‘zero waste’ factories and will have embedded code identifying type and composition of the materials they are made from for ease of disassembly and recovery. Schools and universities will be completely zero waste, as will all construction sites. New buildings will be made from a range of natural and recycled materials. All display material will be compostable and signage systems will be made from 100% closed loop materials.

Many products including some parts of vehicles will literally be grown and able to be composted or recycled at the end of their lives, and all plastics will be able to be recycled on a permanent basis without “downcycling”. Complex assembly processes will include the use of bonding materials that will collapse under microwave heat for ease of disassembly. Many of the parts in products will transcend numerous model changes and will be returned to factories for integration into new models. Most products will be leased rather than sold and will remain the property of the manufacturer who will be accountable for ensuring that there is no waste in their manufacture and their complete life cycle. In a Zero Waste society materials will be “eternal” within the human economy and will only exit into nature if they are totally benign. Old furniture and many other products will be “remanufactured” at dedicated plants and this will become core business for many manufacturers and sold alongside their new products. The deconstruction industry will be massive with no parts of

dismantled buildings or structures permitted to be wasted. Each new building will need to provide a full dismantling plan before receiving a building permit.

A whole new “minus” economy will emerge and grow to almost the size of and integrate into the “plus” economy. Through application of the “proximity principle” which can be largely stated as “the highest use within the shortest distance”, local economies will once again experience economic growth through development of a range of recycling, processing, manufacturing and remanufacturing industries. The manufacture of materials handling and processing equipment alone will contribute significantly to some economies. A range of government led policies and economic instruments progressively applied since 2002 will power the whole system. The first will be to set Zero Waste as the target and a date to achieve it by, along with the establishment of a national Zero Waste Agency to drive and animate the transition. Escalating landfill and incineration levies will be applied along with a range of advanced resource recovery fees on a wide range of products. There will be industry stewardship agreements and programmes, taxes on non-recyclable products, removal of subsidies for extraction of virgin materials, full cost accounting procedures for all disposal facilities and progressive bans on the incineration or landfilling of a wide range of materials starting in 2002. From 2003 onward there will be absolutely no organic matter going to landfill. All landfills will be surveyed and most will have been completely mined and remediated by 2020.

There will be change in societal values as people question the disparities of modern society and the consumer ethos that will be seen as shallow and meaningless. There will be courses on how to live simply. Simplicity will be not only become fashionable, but also a new measure of importance and prestige in the same way that conspicuous consumption is at present. There will be a return to the values of community and a deep understanding by each citizen that nature has limits. Companies will prepare and publish annual audited environmental, social and financial accounts and will require a “Social License to Operate” in every community that they do business. It will be the end of the age of waste!

Predicting the Present

Although the scenario painted above may seem improbable, almost every aspect of it is either happening right now or in the process of being implemented. Some of the ideas are in the development stage and others whilst sounding a little far fetched will surely be achievable within the timeframe of 2015. A later version of this document with references to what is currently happening and where, will be available at www.zerowaste.co.nz

Will there be landfills in 2020?

It's not quite that simple – we need to distinguish between current and historic flows. By 2020 all current waste flows will be eliminated and we will have achieved a 100% materials efficient industrial economy. We will still need safe secure land storage facilities although nowhere near on the vast scale that we have at present. This is because there are historic material flows stored within society that will be released slowly and over a much longer time frame than the Zero Waste goal of say 2015 or 2020. Historic waste includes materials embedded in buildings that were not designed for recovery and various incompatibly bonded and unidentified or non-coded materials. New processes will be designed for dealing with these materials such as processing old composite building materials (chipboards and particle boards) into new quality building materials. Gypsum board will be a completely closed loop Zero Waste product and banned from landfill by 2005. As more new technologies for dealing with, processing and extracting value from old materials and products, historic waste flows could be reduced to less than 2% of their current volume.. Landfill space may be well over \$NZ1, 000 per tonne with an annual fee payable to cover the internalised costs of disposal and storage and all landfills will be in public ownership. All land filled material will be itemised and mapped for future treatment as new technologies emerge. Landfill space rents will only cease once materials have been uplifted for reuse.

Big Picture Vision

When in crisis you need a “big picture” vision – one that will challenge and motivate people to change. We need a big picture vision for waste that sets the scene for a “materials revolution”. Many who run businesses based on treating society's discards as waste don't know it but the materials revolution is already under way and unstoppable. Zero Waste is a driver for a sustainable society because it addresses material flows and the problems of hyper-production and consumption. These are inextricably linked not only to the environmental crisis but also to growing social problems being faced in all industrial countries. Ultimately waste is a social problem and as such cannot be left to the technicians and experts in a single industry whose motives may or may not be aligned with the best interests of the wider community.

The power of Zero Waste lies in its simplicity and potential to popularise and animate change, but also in its potential for communities and ordinary people to join with business to redesign the industrial system and bring an end to the age of waste.

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References

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5. For the full report visit <http://www.dnr.state.oh.us/recycling/pages/reis.htm>
6. See <http://www.zerowaste.co.nz> (National Campaign)
7. The Centre for Design at RMIT University <http://www.cfd.rmit.edu.au/>

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