A CITIZEN'S GUIDE TO ZERO WASTE

A UNITED STATES / CANADIAN PERSPECTIVE [1]

A strategy that avoids incinerators and eventually eliminates landfills

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1. INTRODUCTION

This *Citizens' Guide* is an updated and expanded version of an article Paul Connett circulated to grassroots communities in several different countries entitled, *Alternatives to Trash Incineration*. Several key events and developments have triggered this update.

First and foremost, Paul Connett met Bill Sheehan, director of the GrassRoots Recycling Network.[2] Bill is as avidly opposed to landfills as Paul is to incinerators. It was Bill who encouraged Paul to attend the meeting of the California Resource Recovery Association (one of the oldest and largest recycling organizations in the US) in June 1999. It was there that we – Paul and Bill - produced the videotape *Zero Waste: Idealistic Dream or Realistic Goal?* (see *Resources* section).

Unfortunately, community groups with single-minded determination to stop an incinerator at all costs have frequently ended up supporting a landfill (often somewhere else!), and similarly, those single-mindedly resisting a landfill have often ended up with an incinerator (also somewhere else!). It was with the strategy of Zero Waste that Bill and Paul have found common ground. We believe it can offer common ground to community groups as well. Zero Waste offers a solution to trash that neither involves incineration nor a large reliance on landfill, and certainly not the huge mega-raw-waste landfills so popular with the solid waste industry. Zero Waste also allows citizens a positive agenda rather than simply opposing something.

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The second key development is that, as of 2001, 40% of the municipal authorities in New Zealand have adopted Zero Waste goals.[3] Most are shooting for Zero Waste by the year 2015 and some by 2020. They have thus shattered the notion that Zero Waste is a hopelessly 'idealistic' cause. Their adoption of a Zero Waste strategy confirms that it is a very practical approach for both local authorities and local activists.

A third important event occurred in 1999 with the publication of the book *Creating Wealth from Waste* by Dr. Robin Murray, an economist from the London School of Economics.[4] About a third of this book is devoted to the concept of Zero Waste. Murray's analysis underlines the sound economic basis for a Zero Waste approach.

A fourth event was Paul's participation in a press conference in Toronto in November 2000, at which Earth Day Canada launched the Target Zero Canada campaign.[5] At this conference Paul met several exciting people including Lucio Di Clemente, chief executive officer of the Beer Store in Ontario, which captures and reuses 97% of its glass beer bottles; Trish Johnson, who has masterminded the successful Take it Back to Retail program in Ottawa, which involves over 300 retailers; Rahumathulla Marikkar from Interface Canada, the multinational carpet manufacturer that is pledged to become a truly sustainable corporation; and Barry Friesen, solid waste-resource director for the Ministry of Environment and Labor in Nova Scotia (see *Resources* section), a province that under his leadership has achieved a 50% diversion of municipal solid waste in just five years. All of them are making significant strides on the Road to Zero Waste. Paul and his son Michael have since visited and videotaped each program.

The fifth key development was a trip organized by Arne Schoevers, director of the Dutch environmental group, Waste & Environment,[6] to the European headquarters of the Xerox Corporation in Venray, Netherlands. Xerox is one of a number of leading corporations that have announced a commitment to Zero Waste. Using a massive 'reverse distribution' system, the Xerox Corporation is recovering its old copying machines from throughout Europe, repairing them, reusing parts, or recycling their constituent materials. Ninety-five percent of the returned material is either being reused or recycled. In the process they have saved $76 million in production and avoided waste disposal costs. Xerox candidly admits that they went into this program for economic rather than environmental reasons, which clearly underlines the fact that Zero Waste is a win-win solution for both the environment and the economy.

All five events for us have reinforced the fact that the move towards Zero Waste is not pie-in-the-sky. That does not mean, however, that it is going to happen without a tremendous effort from citizens, more vision in industry, and enlightened leadership from government officials.

To aid this effort, Grass Roots and Global Video,[7] with the help of the GrassRoots Recycling Network and Waste & Environment, is producing a series of videotapes with the running title, *On the Road to Zero Waste*. We completed *Part 1, Nova Scotia, Community Responsibility in Action* in October 2001. This Guide is designed to accompany this series. In it we will look more closely at three key elements of a Zero Waste strategy: Community Responsibility, Industrial Responsibility and Political Leadership. But first we will look more closely at the Zero Waste vision.

2. ZERO WASTE VISION: Ending the Age of Wasting

The grassroots recycling movement has been tremendously successful over the past 30 years in encouraging communities to handle their discarded materials responsibly. But dealing with waste at the back end is not enough to stem the vast over-exploitation of virgin resources (including fossil fuels) that is the fundamental cause of global environmental degradation. Thus, while the Zero Waste vision recognizes the importance of recycling, it also recognizes its limitations. Communities cannot solve the trash problem alone.

Zero Waste requires a mind shift. We have to change the task from getting rid of waste, to one of ensuring sustainable material practices at the front end of the manufacturing process. Communities faced with discarded materials and objects they cannot reuse, recycle or compost have to demand that industry stops producing them. Total recycling is not approachable without industry's help.

Thus, Zero Waste consciously links 'community responsibility' to 'industrial responsibility.'

Zero Waste combines community practices such as reuse, repair, recycling, toxic removal and composting, with industrial practices such as eliminating toxics and re-designing packaging and products for the key demands of the twenty first century: the need to develop sustainable communities and sustainable companies.

Zero Waste combines ethical practice with a solid economic vision, both for local communities and major corporations. On the one hand, it creates local jobs and businesses, which collect and process secondary materials into new products, and on the other, it offers major corporations a way of increasing their efficiency, thereby reducing their demands on virgin materials as well as their waste disposal costs.

Our current industrial system and throwaway society is based on the one-way flow of virgin resources to polluting dumps and incinerators. Extracting, processing, transporting and wasting resources is a primary cause of environmental destruction and global warming. We need to reconfigure our one-way industrial system into a circular, closed-loop system, recycling discarded resources from communities back to industries, both new and old.

Zero Waste recognizes the larger bookkeeping of nature. We never actually 'own' anything: we are simply borrowing its constituent materials for a short time. We are breaking this 'contract' when we simply throw things away. Nature makes no waste; waste is a human invention. Our task - both in the community and in industry - is to cycle these materials for future use. To do this, more than anything else, we need strong leadership at the community, industrial and political levels.

3. COMMUNITY RESPONSIBILITY

3.1 Zero Waste Policy and Legislation

Several communities have already introduced Zero Waste legislation or goals and they are listed at the end of this section. We have pulled out a number of policy steps that we believe are important for communities to take in order to a launch a Zero Waste program.

1) **Designate a target year.** When adopting a Zero Waste goal, it is important for communities to designate a year by which no waste will be delivered to the 'interim' landfill. Most communities have chosen a year some 15 or 20 years ahead. Doing this allows communities to approach an 'idealistic goal' in a realistic time frame. It allows the mind shift from managing waste to eliminating waste and managing resources time to develop.

2) **Design program with whole community.** During this first step and all subsequent ones it is critical, in our view, that the whole process be overseen and designed by a group of committed people drawn from the community, including people in local government, businesses and private citizens. Without this cooperative effort neither strong laws nor good intentions will go very far.

3) **Ban key items from the landfill.** These should include ALL organic material (that is, compostables, or things that can be composted and safely returned to the Earth), any material that can be currently recycled, and any toxic material that can be dropped off at collection centers or retailers.

4) **Place a surcharge on material that is landfilled.** This is important for two reasons: a) to provide a disincentive for the generation of this fraction and b) to provide finance for other critical parts of the Zero Waste program.

5) **Provide incentives for recycling.** It is important to stimulate development of businesses, small or large, that can collect, process and reuse, repair or recycle materials in the community discard stream. Ideally, such businesses will provide jobs for the local community.

6) **Encourage waste audits.** It is critical to provide financial help or professional advice to businesses and institutions to embark on waste audits. Such audits identify where waste is being generated in both industrial processes and office operations, so that it can then be reduced or eliminated. The good news here is that almost invariably when such steps are taken they result in saving money.

7) **Stimulate take-back programs.** Provide incentives to local retailers and manufacturers to take back their products and packaging after use. Such incentives can range from deposits on such things as

beverage and food containers; batteries and automobile tires, to the free publicity that surrounds a community sponsored 'Take It Back' program for hazardous materials like paint, fluorescent bulbs and electronic goods.

8) **Convert old landfill into industrial or ecopark**. Set in motion plans to convert the old landfill site into a completely different operation. As conceived and described by Dan Knapp and others, this site will look more like an industrial park. The local government can own and maintain the infrastructure but franchise out different parts of the site to local businesses involved with collecting, processing, recycling, reusing, repairing and remanufacturing source separated materials and objects in the community discard stream.

It is clear that many these policy changes impact community economics. Instead of paying waste companies to get rid of discards, we are suggesting that tax payers' money is better spent recovering resources. Thus the role of local government changes when discarded materials are treated as community enhancing assets rather than as liabilities (waste). Instead of managing liabilities, local government policies instead promote entrepreneurial innovation by maximizing delivery of clean resource streams to local enterprises.

As materials once considered waste gain value, Zero Waste principles will help local economies become more self-sufficient and create opportunities for increased civic participation and sustainable employment.

To the extent that communities and citizens can pressure industry to reduce the extraction and processing of virgin resources, they not only reduce the demands on local services but they also contribute to solving larger global problems.

Following are examples of communities that have passed Zero Waste legislation, plans or resolutions:

- Canberra, Australia (population 300,000).[8] Australia's capital adopted a No Waste by 2010 goal and plan in 1996. The plan envisions a waste-free city by 2010, with its two landfills replaced by 'Resource Recovery Estates.' Since 1995, recycling has increased 80%. This landfill design looks more like an airport than the typical landfill disposal site.
- Del Norte County, California, USA (population 32,000).[9] Del Norte County is the first county in the United States to guide its solid waste strategy with a comprehensive Zero Waste plan, which it adopted in 2000. Officials expect the plan to ease the conversion from a timber-oriented economy to a new, sustainable economy using local resources currently being wasted.
- New Zealand Councils.[10] As of 2001, 40% of New Zealand's 74 local governments have adopted goals of Zero Waste to landfills by 2015, and an effort is underway to get the goal adopted nationally. Zero Waste New Zealand Trust provides a small amount of grant money to help councils get started but does not supply a blueprint -- that is being developed by local officials, managers and engineers. The trust predicts the creation of 40,000 jobs over 10 years through converting local transfer stations to resource recovery centers, and through the resulting proliferation of reuse and recycling businesses.
- Seattle, Washington, USA (population 534,700).[11] Seattle adopted Zero Waste as a 'guiding principle' in 1998. The plan emphasizes managing resources instead of waste, and conserving natural resources through waste prevention and recycling.
- Santa Cruz County CA, USA (population 230,000) adopted Zero Waste as a long-term goal in 1999.

3.2 Practical Steps

The importance of passing legislation in support of a Zero Waste plan is that it puts a large conceptual umbrella over a whole series of practical steps, many of which are familiar to people who have already been involved in discard management. We will now consider those practical steps.

3.2.1 There are no magic machines. Frequently, after giving a blistering attack on the idea of burning trash or dumping it into a mega landfill, we are asked, "Well, if we can't burn it and we can't bury it, what can we do with it?" Such questioners are usually seeking an alternative technology, because they have become accustomed to

salesmen that offer them 'turnkey' solutions. "Give us this much money and we will solve your trash problem with our state-of-the-art technology," is what they are used to hearing. At the outset, we have to stress that there are no magic machines that can solve the trash problem. Trash is a not a high tech problem. Technology has a role to play but only when judiciously applied to carefully selected components of the discard stream. Zero Waste is not a technology; it is a strategy and that strategy begins with better industrial design and ends with source separation of discarded products.

3.2.2 Trash is made by mixing. From the citizens' perspective, trash is made by the ten things at the end of our hands, and if we want a solution that we and the planet can live with, it is those ten things that have to be co-opted from the very beginning. In short, trash is made by mixing, and it is prevented by keeping discards separated at source.

3.2.3 Source separation. Avoiding expensive and potentially dangerous incinerators and huge regional landfills requires keeping our discarded items in several well defined categories (both mentally and physically). These are:

- avoidables
- reusables
- compostables
- recyclables
- toxic materials, and
- residuals (re-designables)

These separated materials will be discussed under the following headings:

3.2.4 Collection systems.
3.2.5 Avoidables and waste reduction strategies.
3.2.6 Reusables and reuse & repair centers.
3.2.7 Compostables and composting facilities.
3.2.8 Recyclables and recycling economics.
3.2.9 Resource recovery parks and ecoparks.
3.2.10 Toxics, household hazardous waste collection, and take-back programs.
3.2.11 Residuals screening facilities.
3.2.12 Better industrial design.

3.2.4 Collection systems. In our view the most successful public collection scheme for the urban setting is a three container curbside system. This has been used in pilot projects in San Francisco and throughout Nova Scotia. There are many variations on such scenarios. A key point to remember when a community is embarking on a source separation system is to organize separation around the existing collection system. If the community is used to curbside collection of trash, then it is best to organize the collection of recyclables and compostables at curbside. If, on the other hand, the community is used to taking discards to the landfill (this is often the case in small rural communities) or a transfer station (sometimes the case in suburbia), then it is best to organize collection at these facilities.

As far as the number of containers used at curbside is concerned, if communities opt for only two, then it is critical to put the emphasis on collecting source-separated organic discards. This is critical for two reasons: a) it is the organic material that causes so many of the problems at landfills and b) it is very difficult, if not impossible, to pick out clean compostables from the residual fraction. Unfortunately, most communities that use a blue box system put the emphasis on collecting recyclables and thus dramatically reduce the amount of material that they can divert from landfill and eliminate the chance of getting good clean organic material for composting.

With these problems in mind, Guelph, Ontario, departed from the blue box approach (containers and paper in one bin and everything else in another) and developed a two-container system that put the emphasis on getting clean organics. They use a green bag for source separated organics, and the residuals and recyclables go into a blue bag. This is called a wet/dry system. The green and blue bags go into two different sections of light weight trucks and are delivered to a facility that has two sections: a separation line for recyclables and a screening line for compostables. The recyclables are further processed (crushed or baled) to meet market specifications and the compostables are put through a composting operation enclosed in a large building. This two-way division is very simple for the citizen and they have a 98% participation rate. Within a few years the city was achieving a 58% diversion rate from landfill. The city also operates a household hazardous collection depot and a separate collection for bulky yard trimmings.[12]

If communities are able to increase the number of containers to four, then its best to have two containers for the recyclables, allowing the separate collection of paper products. This minimizes the contamination of paper with glass shards from the other recyclable fraction (bottles, cans, etc).

Garbage lottery. Some communities have come up with novel ideas to encourage people to separate their discards carefully. Rockford, Illinois, increased its recycling rate fourfold by introducing a garbage lottery. Each week one household is selected at random to have its garbage picked up and examined. If no designated recyclables are found in the trash, they win $1,000! If that is not the case, a householder the following week stands to win $2,000, and so on. The participation rate in this community increased by 400% in a few months. This system is illustrated on two videotapes produced by Videoactive Productions entitled *Joe Garbario and the Marin Resource Recovery Plant* and *Millie Zantow: Recycling Pioneer* (see *Resources* section).

3.2.5 Avoidables and waste reduction strategies. In recent years two key activities have produced astonishing results with respect to waste reduction.

Waste audits. When local manufacturers and businesses are required to find out at what points in their processes that they generate waste, they typically find many places where they can make less waste and save money in the process. For example, Quaker Oats of Canada, after a waste audit, was able to reduce its waste stream by over 90% and save an enormous amount of money in the process. That's truly, a win-win solution.

Volume-based trash charging systems for households and institutions. Simply put, the more waste you generate, the more you have pay. There are a number of different ways of applying this kind of system. The city of Seattle has a monthly garbage fee that is based upon the size of container used for the residual fraction of the discard stream. Households that opt for a large container for their residuals pay a larger monthly fee than household that opts for a small one. Other communities require a pre-paid coupon to be used on every bag of residuals put out at the curb. These are often referred to as 'Pay-by-bag' or 'Pay-as-You Throw' systems. In some communities in the Netherlands there is an electronic microchip in the residuals container and when the can is picked up it is weighed and the household is automatically charged according to how much residual material they have put out.

3.2.6 Reusables and reuse & repair centers. Many householders and communities around the world have developed both formal and informal means of getting reusable objects moving from one owner to the next. These include garage sales, yard sales, jumble sales, flea markets, and thrift shops run by charities like the Salvation Army and Goodwill Industries. Some of these are run for profit and others as a community service.

While reusables represent a small fraction of the discard stream, it is the most valuable one. Some reuse and repair programs not only recover materials but they also recover people (through job training etc). A municipal official given the responsibility of diverting material from the local landfill needs to investigate how comprehensive the existing services are in his or her community. Such an official should support them in any way possible, including finding ways to bring different reuse and repair functions together in a Community Reuse and Repair Center (the last thing you want to happen is to introduce a facility that puts existing operations out of business). Many models exist.

WasteWise, Georgetown, Ontario. One early example of a community non-profit center is the WasteWise operation. This facility came about because local activists were tired of defending themselves from 'back-end' solutions proposed for their community. They had fought to prevent a large quarry from being used to accept 40 million tons of Toronto's trash and then a 1,500 ton-per-day trash incinerator, again for part of Toronto's waste (Georgetown is about 30 miles from Toronto). They set up WasteWise to show that an alternative approach was possible. With the help of a grant from the Ontario government, they rented a large warehouse and set it up (1) to repair many items like furniture, appliances and bicycles (2) sell these and other ready-to-use items (3) collect, process and sell recyclables not covered by the local blue box (recycling) program, and (4) provide educational services for waste and toxics use reduction. Largely run by volunteers, the operation became self-sufficient after five years and now has two full time staff. A videotape of this operation is available (see *Resources* section).

The important thing about the reuse and repair center is that it can be the springboard for many

other community activities. It can be used for education, especially youngsters, who can be taught how to repair things at an early age. It can provide a venue for senior citizens, many of whom have important repair skills that they are eager to share with the community. It can act as an incubator for small repair businesses by providing affordable overhead. It can be used to teach people how to compost in their backyards and even to build their own composting units out of materials collected at the center. It can also be used to collect potentially hazardous materials like paints, varnishes and cleaners. Paint can either be used in renovation of items for resale or be made available to the public in a 'paint exchange.' The center may also become a meeting place for the community.

Recycle North, Burlington, Vermont. One of the best examples we have seen of a community non-profit operation that includes extensive repair and job training is Recycle North. In addition to a large area devoted to the resale of reusable items, there are four areas devoted to repair. The items that are repaired are (1) large household appliances like stoves and refrigerators, (2) small electrical appliances, (3) electronic equipment and (4) computers. In each section people are trained. After six months they receive a training certificate as well as training in skills needed to get a job (e.g. writing application letters and practicing job interviews). They also attempt to service the local community in other ways. In addition to offering the reusable items at very reasonable prices, they provide these goods in exchange for vouchers provided by the local department of Social Services. In 2000 they generated a gross income of $750,000 and employed over 20 full time staff. They have since added a building deconstruction and salvage service to their operation. A videotape of Recycle North is in preparation (2001).

Urban Ore, Inc. Berkeley, California. Urban Ore is another excellent example of a reuse and repair center run for profit. It is owned and directed by Dan Knapp.[13] This operation grosses over $1.5 million and has created many permanent and well paid jobs. Urban Ore, Inc. has pioneered the resource recovery park concept (see *Resource Recovery Parks* section below)

Hobo Hardware, Guelph, Ontario. This large warehouse handles only reused building materials, fittings and do-it-yourself items. Even though the products are all second-hand, it is run as if the items were new, with tidy arrangements and things easy to find. Paul has visited the store and videotaped the operation and hopes to include in a forthcoming video which examines the business opportunities in the community discard stream.

3.2.7 Compostables and composting facilities. Composting can be run on almost any scale. It can be done in the backyard, in the basement with worm bins (vermiculture), in the community or in a centralized facility. However, a key principle is to maintain tight control over what materials enter the composting operation, because the ability to use the material can easily be compromised if unsuitable materials are composted.

In our view, after source separation, composting is the most important step in the community part of the Zero Waste strategy, because it is the organic material in landfills that cause so many problems. When organic material rots underground it generates (1) methane, which contributes to global warming (molecule for molecule methane traps over 20 times more heat than carbon dioxide), (2) organic acids, which are capable of dissolving the metals in the waste load and getting them into surface and ground water, and (3) awful odors, which make landfills so unpopular with the public. Thus a key objective of composting is to keep organic materials out of the landfill.

The key step in Nova Scotia's program was the passing of legislation banning organic material from landfill. Such a regulation forced both source separation at the household and institutional levels, as well as creation of a back-up screening facility at the landfill (see Section 3.2.8).

Backyard composting is the single most cost effective treatment of a large fraction of the domestic discard stream. Seattle has subsidized backyard composting kits and a Master Composters' program, in which citizens are taught all the ins and outs of composting and are then make themselves available to help other citizens troubleshoot their backyard composting problems. The program is run by the Seattle Tilth Association. A video, *Zoo Doo and You Can Too!* (see *Resources* section), was made at the association's demonstration site and illustrates many home made and commercially available composting units. In our view, the composting of yard trimmings and food scraps in one's backyard is one of the biggest contributions a citizen can make to solving the trash problem.

Community composting. Composting conducted at the community level is well illustrated by the program in Zurich, Switzerland. A 1991 videotape of this program, *Community Composting in Zurich* (see *Resources* section), describes the city's 480 community composting plots involving 3 to 200 households. In August of 2001, Paul revisited the program. The number of community composting operations has risen to about 1,000 and approximately half the householders of Zurich are now served. Paul also videotaped this and it, too, will be included in a forthcoming video focussing on the full range of methods of handling organic discards.

Mulching lawnmowers. A simple and cost effective way of reducing one type of organic waste is to encourage both householders and institutions to use mulching lawnmowers. This one step saved the New York City's Parks Department over $1 million in avoided disposal costs.

Community gardens. Many citizens who might not be interested in community composting may become excited about a community garden. The latter would be ideally supported with a community composting operation. It makes economic sense for municipalities to support such operations, because every pound of organic material composted means one pound of waste that does not have to be picked up, transported and disposed. It is also a very positive way of integrating discard management with the local community. Such gardens have become havens of delight in New York City and other large cities.

Centralized composting facilities. In the United States there are now over 3,000 yard trimmings composting operations.[14] When handling leaves and brush, the technology does not need to be very sophisticated. Composting yard trimmings usually involves a static pile or windrow system. Such windrows are long rows that have a triangular cross section. They need to be turned regularly to make sure that they get a plentiful supply of air and thus maintain aerobic conditions. They can be turned in one long sweep using mobile turning devices like the Wildcat system manufactured in North Dakota and the Scarab in Texas.

In Nova Scotia centralized composting facilities handle all source separated organic material. Seventy-two percent of the citizens in the province are currently provided with curbside collection of organics (see Nova Scotia video listed in *Resources* section).

Around the world, many facilities are composting special organic materials, such as food scraps, agricultural waste, fishery waste, sewage sludge and mixtures of these products. To serve these ends, a variety of in-vessel and indoor systems are designed to speed up the composting process and minimize odors. Such systems are either aerobic (plentiful supply of air) or anaerobic (starved of air). The latter are used to generate methane to be used as a fuel or chemical feedstock. Many of these systems are described in articles that appear in the bible for composting: the monthly journal, BioCycle.[15] This journal is an essential resource for any official who wants to include an aggressive composting component in a Zero Waste program.

Vermiculture is the use of worms to degrade organic material. These remarkable creatures provide yeoman service for those prepared to put them to work. One woman, who has worked with worms practically her whole life, is Mary Appelhof, who lives near Kalmazoo, Michigan. Her book, *Worms Eat My Garbage*,[16] is a delight. Her enthusiasm for these industrious worms has no bounds!

The place where vermiculture has received its largest municipal support is in the area around Bombay, India. There they have a variety of vermiculture sites located in backyards, hospital grounds and near local food markets.

3.2.8 Recyclables and recycling economics. According to professional recyclers, the three golden rules to secure markets for recyclables are 'quantity, quality and regularity.' The industries that will use these materials must be confident that they will get a regular supply of material free from contaminants that can ruin their process, e.g. ceramics in glass, plastics in paper, PVC plastic co-mingled with polyethylene or PET. Source separation schemes have helped to meet some of these demands. The materials recovery facility with human picking lines and along with some mechanical equipment, which can separate steel (magnets), aluminum cans (eddy currents) and plastic cans, helps to complete the process. Hundreds of such facilities are operating around the world. A facility operated by the Miller Corporation in Halifax, Nova Scotia is illustrated in the video, *On the Road to Zero Waste, Part I. Nova Scotia, Community Responsibility in Action* (see *Resources* section).

The economics of recycling. Today, the driving force underpinning the economics of recycling is

'avoided disposal costs.' It costs money to recycle, but it is economically viable when the overall cost of collecting and recycling a ton of recyclables is less than disposing a ton of waste. Yard trimmings composting is particularly favorable when making this comparison.

The enemy of recycling is cheap landfills. Those in favor of recycling need to argue that cheap landfilling is artificially cheap because the long term costs of future damage to the environment, both locally (toxic emissions to air and ground water) and globally (waste of finite resources), are being ignored. The web page of the GrassRoots Recycling Network provides more details of the artificial economics of landfilling.[17]

Shortage of markets for recyclables is often offered as a reason to limit recycling. However, the markets for certain recyclables are an highly cyclic phenomenon, and certainly should not be used as an argument for building a trash incinerator or mega landfill, which represent a long term (at least a 20-years for an incinerator) capital investment. Communities that desire to maximize the price they get for separated recyclables would be advised to secure plenty of space for above ground storage while waiting for the best price for these commodities. For materials that currently have little secondary value, like certain plastics and composite materials, another possibility is selective burial in landfill cells. The location of these burial sites for separated and non-toxic materials should be carefully recorded so that future generations can mine this material safely and efficiently. Again, the principle is simple and sound: rather than bury (and store) materials in a totally uncontrollable fashion in raw mixed waste landfills, it makes more sense to store separated materials in a controlled fashion so that they can be reclaimed in the future. However, it shouldn't be forgotten when these materials are buried that it lets industry of the hook, a case of 'out of sight, out of mind.'

We argue that if we are forced to bury stuff, then this stuff shouldn't have been manufactured in the first place. Some activists advocate a 'return to sender' approach as a way of drawing attention to bad examples of industrial design such as the silly squeezable ketchup bottle. Paul has provided a great deal of amusement at the expense of this particularly bad form of packaging. A little thought would suggest that a simple spoon could deliver ketchup just as precisely from a recyclable or reusable jar, with a wider opening, as a non-recyclable plastic ketchup bottle.

A net profit. The way for recycling to generate a net income for the community is to find ways of utilizing the salvaged materials locally. Examples include: newspaper to make cattle bedding, or insulation material; glass to make fiber glass; tires to make crumb rubber; crab shell waste to make surgical sutures and dietary products; post consumer wood to make fiber board, furniture or flooring, old building materials used to make furniture and old carpets used to make new ones.

Dr. Robin Murray, in his book *Creating Wealth from Waste* (see *Resources* section), provides a very persuasive strategy to encourage companies to move to cities in order to capture the flow of separated resources generated there. Such an approach means that local, rather than distant, economies can capture the 'value added' of local manufacture.

3.2.9 Resource recovery parks and ecoparks. Looking to the future, visionaries like Dr. Dan Knapp of Urban Ore, Inc. envisage Resource Recovery Parks and Ecoparks as the community replacement facilities for landfills and incinerators.[18] These facilities locate reuse, recycling and composting businesses close together and can be the core of a comprehensive strategy for local resource management. Local collection entrepreneurs and the public can deposit all recoverable materials at one processing facility, get paid for some of them and buy other items at bargain prices. Some designs place the recovery park together with a waste facility or transfer station, arranged so that traffic passes recovery businesses before coming to the waste facility. When combined with incentives for recycling, disincentives for wasting, and a commitment to gradually phase out the waste facility, such an arrangement can be the centerpiece of a Zero Waste community.

Resource recovery parks can be privately financed, or local government can create an authority whose role is to secure the land, build the core facility and lease space to private entrepreneurs, as is frequently done for airports. When located close to appropriate industries, resource recovery parks can provide feedstocks for Eco-industrial parks, where the byproducts of one industry become inputs for the next.[19]

Serial resource recovery systems, are a variation of resource recovery parks where a critical mass of resource conservation businesses are located in a neighborhood, but not necessarily on the same property. Repair shops and secondhand shops are good examples of existing businesses that need only to bring their services into greater synergy and prominence in a Zero Waste system.

Urban Ore Ecopark, Berkeley, California, USA. Urban Ore, Inc. has pioneered the resource recovery park concept. In 2001, Urban Ore moved to a 2.2-acre former steel pipe manufacturing facility and established a building materials exchange, a hardware exchange, an arts and media exchange, a general store, and salvage and recycling activities. Two major lumberyards, a hardware store and two other reuse facilities, all in a three-block area, provide a stream of potential customers. Urban Ore Development Associates (UODA), a spin-off of Urban Ore, designs, builds and operate resource recovery parks.[20]

Other Resource Recovery Parks are in development:

San Leandro Resource Recovery Park, San Leandro, Calif., USA. Waste Management, Inc. is developing a resource recovery park that recycles wood, greenwaste, curbside and other recyclables, operates a buy-back center, and sells recycled-content soil and landscape products. Tenants include a tire recycling and crumb rubber facility and a building materials exchange. The park is at a waste transfer site.

Monterey Regional Environmental Park, Marina, Calif., USA. This park includes public drop-off and commercial waste recycling stations, a Last Chance Mercantile reused goods resale operation, a landfill gas power project, a household hazardous waste collection facility, construction and demolition recycling operations, composting facilities, and a soils blending facility, at an existing regional landfill.

3.2.10 Toxics, household hazardous waste collection, and take-back programs. While toxics only make up 1-2% of the household waste stream, if ignored, they threaten other aspects of the Zero Waste strategy. It is important to get these materials identified and made visible.

Curbside collection. Some communities have organized separate curbside collection of certain toxics like automobile oil (Hamburg, NY) and batteries (Neunkirken, Austria).

Household hazardous waste collection sites. Some communities have organized household hazardous waste collection days, on which citizens are requested to bring their hazardous materials to a central collection point. In Halifax, Nova Scotia, there is a very well organized and efficient drop-off facility operating most Saturdays from 9- 4 p.m. This facility is illustrated in the video, *On the Road to Zero Waste, Part I. Nova Scotia, Community Responsibility in Action* (see *Resources* section). Some communities have set aside buildings at the landfill to collect, store and even exchange potentially hazardous materials, like paint, with the community.

Use it up. Some paint manufacturers have offered to reblend recollected paint and donate it for community projects. In New Brunswick, Canada, there is a company specializing in collecting used paint and recycling it into new paint.

In the absence of a commercial operation we would advocate the use of a Community Reuse and Repair Centers (see above) to collect paint and use it for community projects. The principle is a simple one: if it is safe enough to use (and it may not be, but this is a different issue) then it is safe enough to use up. If the individual cannot use it up, the community should.

Producer Take-Back. Some toxic substances, like mercury, are so intractable that we should question their use altogether. If industries insist on mercury's continued use and governments allow them, then legislation should be introduced that would require these industries to take back the mercury-containing objects, such as household batteries, thermometers, and fluorescent lights. A citizen, who has devoted the last few years attempting to get governments and industries to eliminate the mercury problem, is Michael Bender in Vermont USA.[21]

In a similar fashion to mercury, we should require the oil industry to take back used motor oil, and tire manufacturers (where communities don't have access to modern tire recycling facilities like the one in Nova Scotia) to take back used tires. These manufacturers should be challenged to find chemical ways of recovering these valuable feedstocks and put them back into their manufacturing process. They need to 'close the

loop.' This is called *Extended Producer Responsibility* for waste or EPR (see Section 4.2).

Retailer Take Back. Ottawa, Canada, has a successful 'Take It Back!' (to retail) program in which over 350 retailers take back from customers 65 different toxic and difficult-to-recycle products that do not belong in curbside recycling bins.[22] These items include used motor oil, batteries, consumer electronics, and prescription drug containers, among others. Retailers are anxious to get involved because of the free publicity and the way being on the program attracts customers into their stores. Trish Johnson, who directs this award-winning program, described some of the details in the video *Target Zero Canada* (see *Resources* section). Inspired by the Ottawa example, Washington County MN, USA, has introduced a similar program.

While Retailer Take Back programs put the emphasis on retailer responsibility for waste, the ultimate goal is to build a community coalition to increase pressure on the manufacturers, or Brand Owners, who profit from making products that become waste, and, more importantly, who make the design decisions on toxicity, durability and recyclability of products and packaging. And in the meantime, such programs educate citizens that there is no *a priori* reason that taxpayers have to continue to clean up after industry. We anticipate that as the program evolves and retailers question the expense of disposing brand name products, retailers will begin to put pressure on manufacturers to take financial or physical responsibility for their products at end-of-life.

3.2.11 Residuals screening facilities. After source separation has kicked in and materials like reusables, recyclables, compostables and hazardous materials have been sent to different facilities for processing, there will still be a fraction left over: *the residuals*. This fraction consists largely of the items that are deemed to be currently non-reusable, non-recyclable or non-compostable. To this we have to add materials that individuals or institutions have not bothered to put into the correct container.

Ultimately, in the Zero Waste strategy we have to develop creative and forceful ways of telling manufacturers that if the community cannot reuse, repair, recycle or compost these objects or this material, they should not be making them (see *Industrial Responsibility*, below).

In typical communities in North America, once the community has done what it can with recycling and composting, the residue is shipped off to landfills. Often these landfills are very distant and very large. The rationale for their development has been the need for expensive and complicated engineering systems to contain, collect and treat the leachate (garbage juice!) that emerges from them. This equipment, along with the lining systems, is so expensive that it is usually cost-prohibitive for the community to use this back end approach on a small scale for local needs; hence, the drive for regional facilities.

We have argued that, despite this equipment and these lining systems, all landfills eventually leak toxic materials into the ground water and emit other polluting gases and particulates into the air. We have further argued that if engineers cannot control what comes out of a landfill, the community's only rational choice is to control what goes in.

Controlling what goes into a landfill. There are two stages at which control can be exerted over what goes into the landfill. The first stage comes from source separation prior to curbside pick up, leading to all the measures discussed in the activities described above (e.g., reuse, repair, composting, recycling and toxic removal). The second level of control can be exerted immediately prior to landfill in a *residual screening facility*.

We further argue that, if the residual screening facility is properly overseen by the community, there will be little or no need to build huge regional landfills. With community controlled screening facilities we can return to the small, locally operated landfill.

One of the first such screening facilities is operating in Halifax, Nova Scotia and is illustrated in the videotape, *On the Road to Zero Waste, Part I. Nova Scotia, Community Responsibility in Action* (see *Resources* section). This screening facility, locally called a 'front-end processing facility,' starts with conveyor belts manned by well-protected workers. These workers separate out more recyclables (which escaped the source separation net), bulky items, and toxic materials like batteries and paint cans (which escaped household hazardous waste drop off centers). They leave on the conveyor belts (i.e., using a negative sort) a dirty organic fraction as well as a variety of non-recyclable plastic items. This material is shredded and put through another composting process. The

purpose of this operation is to stabilize the dirty organic fraction biologically for 21 days prior to landfilling. With more effective source separation and longer curing times this material might (after the plastics are removed) eventually be used for landfill cover. When Paul visited the landfill at the end of this operation he was struck by how odor-free the landfill was and the almost total absence of seagulls or other birds.

We would argue that, if the screening facility is properly overseen by the community, there will be less, or no, need to build huge regional landfills with elaborate lining systems. With community controlled screening facilities we can return to the small, locally operated landfill. In Halifax, however, they have backed up their 'residual screening facility' with a double lined, leachate collecting system at the landfill. While, it may be a good idea to have a back up, the danger is that this back end support might eventually undermine the care with which toxics are removed and organics are stabilized.

3.2.12 Better industrial design. This is not the end of the road to Zero Waste. Even though the material exiting a 'residual screening facility' may be biologically stable and safe to bury, it still represents a waste of resources, some of them in finite supply. We believe that the objects and materials that end up in this interim landfill should be studied, possibly by research students destined to work in manufacturing industries. They should be challenged to recommend design changes in manufacturing to avoid this fraction in the future. In short, we need *better industrial design* for the 21st Century. In our view, this is where community responsibility can help drive industrial responsibility.

3.3 Community Success Stories

In the late 1980's, Dr. Barry Commoner and co-workers performed an experiment in East Hampton, Long Island in the state of New York.[23] With the help of 100 volunteer families they measured how much diversion from landfill could be achieved with a four-container system and existing commercial recycling and composting facilities. They used one container for bottles, cans and other hard recyclables, a second container for all paper products, a third for the compostable fraction (they used a multiply kraft paper bag for this fraction), and a fourth container for the residuals. In this experiment they achieved a remarkable 84% diversion from landfill.

Critics have argued that this sample is not a representative of the American people and that the 100 families were highly committed to the success of the project. We would argue that this is precisely the point. This experiment showed how much diversion was physically possible when you had a very strong commitment from householders. From our point of view, it clearly underlines the need to spend sufficient money from the waste budget on the kind of education programs that might generate this kind of commitment.

USA recycling rate. Despite the pessimistic projections of waste experts in the early 80's, who suggested that the maximum recycling rate you could expect from a typical American community would be about 15%, Americans have done far better than this. A survey financed by the US Environmental Protection Agency indicates that over the whole country, in 1996, Americans were recycling 27.3% of the municipal discard stream,[24] with nearly 9,000 curbside recycling programs in operation.[25] But that is for the whole country. This includes states that are recycling a lot and others that are doing very little.

NJ recycling rate. Without including junked automobiles and construction and demolition debris (C& D), the state of New Jersey is diverting over 45% of its municipal discards from landfills. If we include the autos and C & D, they are diverting over 60%.

California recycling rate. California has a recycling law that required communities to divert 50% of their discards from landfill by the year 2000. Over 60 communities had reached that target by 1996, and as many as half of all communities may have actually reached the target on time (reports are not due until the end of 2001).[26]

Nova Scotia recycling rate. In 2000, the province of Nova Scotia became the first province in Canada to achieve a 50% diversion from landfills.

Recycling in Communities. While states and countries can stimulate recycling with appropriate legislation, incentives and government purchasing, it is not states or countries but communities that recycle. National statistics that combine data from both excellent programs with very poor ones give a misleading impression of what an individual community can achieve. Thus officials from a

village, town or city who are wondering how much they can divert from a landfill should comb the world, and the Internet, to see how much a community of their size and demography has actually achieved and consider whether they can copy their example or improve upon it.

Nova Scotia communities. A good place to start would be the Canadian province of Nova Scotia. In the sections above many of the details of this program have been described. Their program includes: backyard composting, curbside collection of all other separated organic material, curbside collection of recyclables, drop off facilities for all beverage containers except milk cartons (there are 95 eco-centers scattered throughout the province that collect these deposit containers), deposits on tires and recycling of tires to crumb rubber, household toxic waste collection sites and a 'residual screening facility' to handle and process the residuals prior to landfilling. Only non-toxic , non-recyclable and non-biodegradable materials are accepted at the landfill. Remarkably in just five years, the program has achieved over 50% diversion from landfills and in the process has generated over 3000 jobs. If we exclude construction and demolition ('C&D') debris, the city of Halifax in the year 2000 had reduced the amount of discards (calculated per capita to allow for population growth) going to landfill by nearly 60% over 1989 figures.

Citizen driven. A very exciting element in the Nova Scotia program is that it has been largely driven and designed by citizens, particularly the 'It's Not Garbage Coalition.' It was the citizens who produced a report in which the word 'waste' was struck out every time it appeared and replaced with the word 'resources.' To their credit, the Nova Scotia authorities, after initially proposing a trash incinerator to get them out of their landfill woes, have worked with citizens to make this program possible. Indeed, following the citizens' cue, Barry Friesen's title at the Ministry of Environment and Labor is 'Solid Waste *Resource* Director'.

United States communities. From 1996 to 1998, the Institute for Local Self-Reliance identified 100 communities and nearly 200 businesses, institutions, and other organizations reporting waste reduction rates at 50 percent or higher. The results of that survey are summarized in a report, *Cutting the Waste Stream In Half: Community Record-Setters Show How*, much of which is posted on ILSR's website.[27] The next two communities are from that study.

San Jose, California, USA (population 849,363). 60% of materials from single-family households are recycled or reused; 47% of overall municipal solid waste is diverted from landfill; businesses receive financial incentives to reduce waste.

Loveland, Colorado, USA (population 37,352). This rural community recovers 56% of residential materials for reuse and recycling using dual-collection vehicles that pick up both recyclables and trash.

Guelph, Ontario, Canada (population, 100,000) 58% of materials diverted from landfill. Uses wet/dry collection system. 98% participation rate. No waste goes direct to landfill. 67% diversion of wet waste. 51% diversion of dry waste. Overall: 58% diversion.[28]

Belleville, Ontario (population 37,000) 63% reduction to landfill.

Sidney, Ontario (population, 17,000) 69% reduction to landfill.

Trenton Ontario (population, 15,000) 75% reduction to landfill.

These three towns are part of a 15- municipality, blue box-2000 program. 20 materials are collected at curbside. They use a 'pay-by-bag' system and provide incentives to residents to compost in their backyard (65% participation rate).[29]

Canberra, Australia (population 273,300). 51% diversion from landfill in 1996, 12% of this was construction and demolition debris.[30]

Bellusco, Italy (population 6,000). This small town is in the Milan area. 73% of municipal discard stream is diverted from landfill. Curbside collection of paper and green waste. Drop-off containers plus a very smart drop-off center run by volunteers.[31]

Gazzo, Italy (population 3,220). Community near Padua. 81% diversion from landfill. No details.[32]

4. INDUSTRIAL RESPONSIBILITY [33]

4.1 Introduction

The two major reasons we have become a toxic, throwaway society are that (1) taxpayers subsidize the extraction of virgin materials that compete with recovered (or secondary) materials, and (2) taxpayers assume the burden of disposing whatever products and packaging industry chooses to market. Hitherto, however, taxpayers and local government have had little say in the production of things that become waste. The Zero Waste strategy requires that this connection be made.

4.2 Producer Take Back

The principle of Producer Take Back, or Extended Producer Responsibility (EPR) for waste, holds manufacturers, and specifically brand owners, responsible for managing their products and packaging at the end of their useful life. EPR policies in Europe have led to company recycling rates close to 90% and high recycled content, as well as an emphasis on reusable and returnable packaging. The policy has spread to other countries as well, including Canada and nations in Asia and Latin America. Often, U.S.-based companies follow EPR requirements in other countries but do not replicate the programs in the United States.

Examples of EPR programs in the United States and Canada include:

Deposit Systems for Beverage Containers. Deposit systems transfer the costs of recycling from taxpayers to consumers and beverage manufacturers. Deposits are not only fair; they work. In the ten U.S. states with container deposits, recycling rates average 80% for containers covered by deposits, compared with far less in non-bottle bill states (for example, around 10% for plastic soda bottles in non bottle bill states). In Canada, where the beer industry invested in refillable glass bottles, 97% of bottles are returned to the producer for refilling.[34]

Take-Back Programs for Toxics. British Columbia's Product Stewardship laws require producers to take back household chemicals such as paint, thinners, pesticides, fuels and medicines for recycling or safe disposal. Millions of gallons of these toxic chemicals are collected at industry-funded depots at no cost to local communities. The costs create incentives for producers to keep toxic leftovers to a minimum.

Local Take Back to Retail. Ottawa, Canada, and Washington County, Minnesota USA, have implemented successful programs targeting problematic wastes not covered by curbside programs, as an alternative to taxpayer funded Household Hazardous Waste programs. Retailers like the program for its free publicity and opportunity to get return customers. These are examples of voluntary Retailer Responsibility programs that can complement other Producer Responsibility programs.

4.3 Environmentally Preferable Purchasing

Any organization, business or individual can promote Zero Waste by altering buying habits. Many government agencies and companies have already adopted preferences for recycled content products. Many are now moving to broader, environmentally preferable purchasing programs seeking to reduce resource use, cut air and water emissions, or achieve other environmental goals. Purchasing practices can target:

- materials purchased for manufacturing products and packaging;
- products purchased for use within the organization;
- packaging for products and materials delivered to the organization; or
- products specified through contractors, such as direct mailers, billing agents, printers, copier companies, office products retailers, architecture and construction companies.

Examples:

U.S. Federal Agencies. As a result of Executive Orders in the 1990s, federal agencies are taking the lead in buying recycled paper and other recycled products, as well as products that include features such as reduced toxics and reduced energy needs.[35]

b) King County, Washington USA is a national leader in buying environmentally preferable products and has an excellent website.[36] Likewise, the Pacific Northwest Pollution Prevention Resource Center has excellent resources on its website.[37]

4.4 Product and Packaging Design

Many companies have been innovative in redesigning products, whether to reduce costs or to meet government incentives or requirements. Some have redesigned packaging to minimize materials. Others have redesigned products for ease of reuse and recycling. Still more have transformed the concept of their products to eliminate waste. Extended Producer Responsibility encourages manufacturers to design products for easy disassembly, to minimize the cost of manufacturer responsibility for recycling. A few examples include:

Interface, Inc. (Dalton GA, USA) This maker of commercial carpets is changing its focus from providing a product to providing a service, leasing carpets to customers and taking back old carpet and tiles for refurbishing or recycling. Interface also pioneered the practice of installing carpet in tiles, so that only high wear places need to be replaced when worn out.

Herman Miller (Zeeland MI, USA) In manufacturing office furniture, Herman Miller used to receive molded plastic chair seats in single-use cartons containing shells in bags, separated by chipboard sheets, placed 56 to a double-sided corrugated box. After unpacking the seats and assembling the chairs, Herman Miller was left with 30 pounds of packaging for every 56 chairs. The company developed, with its vendor, a protective rack that stores 90 seats in the space that previously housed 56 and can be reused 80 to 100 times or more.

4.5 Comprehensive Zero Waste Business Approaches

Businesses pursue Zero Waste, in addition to redesigning products, by:

- Re-evaluating products and services to create the greatest consumer and environmental value, within economic feasibility;
- Minimizing excess materials and maximizing recycled content in products and packaging;
- Finding productive uses for, reuse, recycling or composting over 90% of their solid waste;
- Reducing procurement needs, then specifying products that meet Zero Waste criteria;
- Establishing easily accessible repair systems, as well as recovery processes for packaging and products.

Examples:

Collins & Aikman, Dalton, Georgia, USA.[38] These makers of automotive fabric and trim sent zero manufacturing waste to landfill in 1998. Waste-minimization and energy-efficiency programs boosted production 300% and lowered corporate waste 80%.

Xerox Corporation, Rochester, NY, USA.[39] In 1999, the company non-hazardous solid waste recycling rates worldwide reached 87% and beneficially managed 94% percent of hazardous waste through recycling, treatment or fuels blending.

Xerox corporation, Venray, Netherlands. Venray is the manufacturing headquarters of the Xerox corporation in Europe. There, Xerox operates a massive 'reverse distribution service' to recover old copying machines from 16 European countries. They reuse these machines or reuse their parts, or recycle their materials. They are only sending 5% of the returned materials for waste disposal. In 2000, this operation saved the company $76 million in reduced production costs and avoided disposal costs. This operation will be the subject of a future video: *On the Road to Zero Waste. Models of Industrial Responsibility*.

ZERI Breweries, Africa, Sweden, Canada and Japan.[40] The Zero Emissions Research and Initiative (ZERI) Foundation has helped design breweries that utilize 40 different biochemical processes to reuse everything, including heat, water and wastes. A digester transforms organic wastes into methane gas for steam for fermentation. Spent grain is used to grow mushrooms. Alkaline water supports a fish and algae farm.

Fetzer Vineyards, Hopland, California, USA.[41] Fetzer recycles paper, cardboard, cans, glass, metals, antifreeze, pallets and wine barrels; composts corks and grape seeds. Garbage was reduced by 93% in the past several years, with a goal of no waste by 2009.

5. THE NEED FOR GOOD LEADERSHIP

When we examine successful cases of Zero Waste, it is clear that leadership has come from all the areas of business, government and non-governmental organizations. We can anticipate even more leadership from the business community because reduction in waste here is indelibly linked to economic benefit.

When we look at communities that have achieved major breakthroughs, we find the key to their success is the fact that the government was prepared to work with community activists to design their programs. This was the case in Canberra, Australia, which first introduced the 'No Waste to Landfill' concept in the mid-nineties, and the province of Nova Scotia, in Canada, which has diverted 50% from landfill in just five years. The message is a simple one. As far as a genuine sustainable solutions are concerned, the future belongs to those in local government who put their faith in people, not 'magic machines'.

6. CONCLUSION

We would not wish to imply that achieving Zero Waste, or even getting close, is going to be easy. While simple in principle, the execution of these systems requires a lot of hard work, perseverance and creativity from the organizers in the community and in industry .We believe that adopting the Zero Waste goal as a local government or industry policy is the best way to get started. It forces the paradigm shift. It transforms the task from getting rid of waste to saving resources.

We should recognize that currently there is a considerable amount of tension between long-term goals and interim solutions. While the long term goal is to have no landfills, in the interim we need some kind of landfill to handle the non-toxic and non-biodegradable residuals. The worry is that these 'interim' landfills may get fossilized unless citizens keep the pressure on local officials to live up to their Zero Waste commitment. Similarly, there are some commentators who are uneasy about how much money communities are putting into curbside collection of recyclables, when they believe that ultimately the collection (and re-design) of their packaging should be industry's responsibility.

For industrial officials, in addition to reducing toxic use and resource conservation, it means searching for ways of getting back objects and materials from their customers so that they can be used again. If the huge Xerox corporation can take on the daunting task of recovering its used copying machines (which contain over a 1,000 parts) from all over Europe, and clean, repair their parts or recycle their material components, any manufacturer *should be able to do it*. Moreover, when manufacturers hear that Xerox is saving $76 million a year doing this, they *should want to do it!* Moreover, once companies take on such a recovery task, it then feeds into the need to design new products with this ultimate goal in mind i.e. to make them easier to disassemble and reuse their constituent parts.

For the local official, the new Zero Waste paradigm, transforms the old 'waste disposal' task from the distressing one of looking for new landfill or incinerator sites, to a much more exciting one of searching for entrepreneurs who can create viable businesses that utilize discarded objects and materials. This task is better both for the planet and the bureaucratic 'psyche' than attempting to locate a hole in the ground or a non-existent 'magic machine' that will make the problem disappear.

The Zero Waste paradigm also offers another challenge and reward and that is working constructively with citizen activists rather than dreading their appearance at public meetings!

Our experience has convinced us of several things:

a) However daunting the task may appear, the Zero Waste approach is moving our society in the right direction.

b) It is certainly far superior to a reliance on raw waste landfilling or incineration.

c) It will improve as more and more manufacturers learn to combine selling to the present with sharing our limited resources with the future.

d) As far as community responsibility is concerned. People are not the problem. Once they recognize that source separation is easy, that it is in the best interests of their children and those in charge have organized effective systems to handle the materials they separate, they readily cooperate to make the system work.

e) As far as the local economy is concerned the pay off is far greater than the dead end of landfills and incinerators. With the latter a huge amount of money is put into complicated machinery and most of it leaves the community, and probably the country, in the pockets of multinational corporations. Whereas, with the low-tech components of the Zero Waste program most of the money stays in the community creating local businesses and local jobs.

f) Finally, we believe that the Zero Waste approach is the one that is most likely to lead to questions on how we should be living on a finite planet.

Today, with so much that we do, we are living on this planet as if we had another one to go to! The average person's most concrete connection to this important realization is our trash. The way we handle our discarded material is a microcosm of the way we handle our planet. If we care about the planet we have to care about the way we treat our discarded materials

While the economic and environmental benefits of a Zero Waste goal are very clear, ultimately the issue is an ethical one. Alan Durning brilliantly outlines the ethics in his book How Much is Enough?[42] He shows how a combination of slick advertising and too much time in front of the TV has trapped so many of us in a mindless binge of consumption. But the good news is that it is not making us very happy. Durning points out that while Americans are consuming in 2000 about five times more per capita than our ancestors in 1900, we are not five times happier. Meanwhile, the gap between our consumption patterns and the poorest fifth of the world's population steadily increases. As Mahatma Gandhi so succinctly and wisely put it, "The world has enough for everyone's need, but not for everyone's greed."

In short we have been seduced into believing that happiness lies in the series of objects we buy, rather than the relationships we nurture with our friends, our loved ones and our community. Thus in our view the antidote to over-consumption is community building.

If we are to succeed, the task of achieving, or moving towards, a Zero Waste society must be seen to be exciting, challenging and fun. If we approach it only with a sense of moral duty, and not with a sense of business opportunity, we will probably fail. If we approach reduced consumption with a sense of loss, rather than the opportunity to regain our 'sense of community' we will certainly fail. As far as having fun is concerned, We cannot think of anything quite as challenging, and as exciting, as having people in our communities, from businesses, from government and from activist circles, working together to create a community that is determined to share as much of their resources with the future as it can. Especially if we remember to celebrate often.

7. ZERO WASTE RESOURCES

VIDEOS

- *Zero Waste: Idealistic Dream or Realistic Goal?* (1999, 58 minutes; 2000, 28 minute version). This video was produced by Paul Connett, of Grass Roots and Global Video (GGvideo) with the help of the GrassRoots Recycling Network. The video conveys a sense of excitement, immediacy and practicality about recycling, reuse, deconstruction, sustainability and zero waste. It has been translated into two languages and distributed, by Essential Action, to activists in 20 countries.

- *Target Zero Canada* (2001, 51 minutes) covers the launch of a Zero Waste strategy for Canada and elaborates on principles and practicalities of the Zero Waste concept in both Canadian communities and industries. (See description in *Section 1*, above.)

- *On the Road to Zero Waste*. This new series of videotapes will spotlight successful initiatives in communities and businesses that illustrate community responsibility, industrial responsibility and political leadership needed to get to Zero Waste. The series is being produced by GG Video and co-sponsored by Waste and Environment (Netherlands) and the GrassRoots Recycling Network (USA).

- *Part 1. Nova Scotia: Community Responsibility in Action* (32 minutes, 2001). This videotape covers many aspects of a Zero Waste program as described in this paper.

Videos by Paul Connett and GG Video can be purchased from the GrassRoots Recycling Network, by check to GRRN, P.O. Box 49283, Athens GA 30604-9283 (Tel: 706-613-7121), also described at www.grrn.org. All videos are $12 (postage included) for grassroots activists (add $6.00 to cover international postage), and $25 for libraries, local governments and all others. Check the status of new videos on www.grrn.org/order.

Earlier videos by Paul Connett referred to in the text were produced by Video-Active Productions and are available from GG Video, 82 Judson Street, Canton, NY 13617. Phone 315-379-9200. Fax: 315-379-0448. Email ggvideo@northnet. All videos are $12.00 (postage included. Add $6.00 for international postage).

- *WasteWise: A Community Resource Center* (1991).
- *Community Composting in Zurich* (1991)
- *Zoo Doo and You Can Too* (1988)
- *Joe Garbarino and the Marin Resource Recovery Plant (1987).*
- *Millie Zantow: Recycling Pioneer and the Trashman (1987).*

RECENT BOOKS & REPORTS

- *Creating Wealth from Waste*, by Robin Murray (London: Demos, 1999).

- *Zero Waste Briefing Kit*, by GrassRoots Recycling Network (2001).

- *Wasting and Recycling in the United States 2000*, by Institute for Local Self-Reliance for GrassRoots Recycling Network (2000).

- *Welfare for Waste: How Federal Taxpayer Subsidies Waste Resources and Discourage Recycling*, by GrassRoots Recycling Network, Taxpayers for Common Sense, Friends of the Earth, Materials Efficiency Project (1999).

- *Materials Matter: Toward a Sustainable Materials Policy*, by Ken Geiser (Cambridge: MIT Press, 2001).

Most items listed above can be previewed and purchased on the GrassRoots Recycling Network website at www.grrn.org/order/order/html.

ZERO WASTE WEB SITES

- GrassRoots Recycling Network
  www.grrn.org

- Zero Waste New Zealand
  www.zerowaste.co.nz

- Target Zero Canada
  www.targetzerocanada.org

ENDNOTES

[1] This guide may be downloaded from the internet at www.grrn.org/zerowaste/zerowaste/community

[2] The GrassRoots Recycling Network (GRRN) is a North American network of waste reduction activists and professionals dedicated to achieving sustainable production and consumption based on the principle of Zero Waste. Founded in 1995 by members of the Sierra Club Solid Waste Committee, the Institute for Local Self-Reliance, and the California Resource Recovery Association, GRRN uses grassroots advocacy, organizing and activism to advance policies and practices based on government, corporate and individual accountability for waste (see footnote on page 1 for contact information).

[3] See Zero Waste New Zealand Trust website: www.zerowaste.co.nz. Contact: Warren Snow, email: wsnow@envision-nz.com

[4] Murray, Robin, C*reating Wealth from Waste*, by Robin Murray (London: Demos, 1999). Email: postmaster@ecologika.demon.co.uk (see *Resources* section).

[5] Target Zero Canada, Website: www.targetzerocanada.org

[6] Arne Schovers, Waste and Environment; Email waste.and.environment@hetnet.nl

[7] The mission of Grass Roots and Global Video is (1) expose environmental injustice; (2) communicate scientific controversy with integrity and clarity; (3) spotlight communities, institutions and companies that are pursuing sustainable solutions to environmental problems (see footnote on page 1 for contact information).

[8] See website: www.act.gov.au/nowaste

[9] Contact: Del Norte County Solid Waste Management Authority at 707-465-1100 or email: recycle@cc.northcoast.com . The Del Norte County Waste Management Authority Zero Waste Plan (February 2000) can be viewed at www.grrn.org/order/order.html#del_norte

[10] See website: www.zerowaste.co.nz. Contact: Warren Snow, Email: wsnow@envision-nz.com

[11] See website: www.ci.seattle.wa.us/util/solidwaste/SWPlan/default.htm

[12] Roumpf, J. (1998). 'Wet- and dry -all over,' Resource Recycling, April 1998, 29-34; Kelleher, M. (1998). 'Guelph's Wet-Dry System. Up-to-date costs are now available,' Solid Waste and Recycling, Feb/March 1998, 34-35.

[13] Contact: Dr. Dan Knapp, Urban Ore, Inc., 6082 Ralston Avenue, Richmond, CA 94805. Phone: 510-235-0172, Fax: 510-235-0198; Website: urbanore.citysearch.com/1.html

[14] Glen, J. (1998). 'The State of Garbage in America,' *BioCycle*, April 1998, 32-43.

[15] *BioCycle, Journal of Composting and Organics Recycling*, published monthly by the JG Press, Inc. ISSN 0276-5055. Subscription offices: 419 State Avenue, Emmaus, PA 18049; Tel: 215-967-4135; Website: www.biocycle.net

[16] Contact: Mary Appelhof, Flowerfield Enterprises, Inc., 10332 Shaver Rd., Kalamazoo, MI 49024; Tel: 616-327-0108; Fax: 616-327-7009; Website: www.wormwoman.com

[17] See website: www.grrn.org/landfills.html#resources

[18] *Generic Designs and Projected Performance for Two Sizes of Integrated Resource Recovery Facilities*, by Urban Ore, Inc., for the West Virginia Solid Waste Management Board, January 1995 (order at www.grrn.org/order/order.html)

[19] See *Resource Recovery Parks: A Model for Local Government Recycling and Waste Reduction*, by Gary Liss for the California Integrated Waste Management Board, 2000 (www.ciwmb.ca.gov/LGLibrary/Innovations/RecoveryPark). Contact: Gary Liss; Tel: 916-652-7850; Email: gary@garyliss.com; Website: www.garyliss.com

[20] Contact: John Moore, UODA, 1970 Broadway, Suite 950, Oakland, CA 94612, 510-893-6300 or jmoore@recyclelaw.com

[21] Contact: Michael Bender; Tel: 802-223-9000; Email: MTBenderVT@aol.com; Website: www.mercurypolicy.org

[22] Ottawa Take It Back! website: city.ottawa.on.ca/gc/takeitback/index_en.shtml . See also www.grrn.org/resources/ottawa_take_it_back.html

[23] Commoner, Barry, et al (1988). 'Intensive Recycling: Preliminary Results from East Hampton and Buffalo,' presented at the Fourth Annual Conference on Solid Waste Management and Materials Policy, Jan 27-30, 1988, New York City. Copies available from CBNS, Queens College, Flushing, NY 11367. Phone: 718-670-4192.

[24] US EPA (1998), *Characterization of Municipal Solid Waste in the US: 1997 Update* (EPA 530-R-98-007).

[25] Glen, J. (1998). 'The State of Garbage in America,' *BioCycle*, April 1998, 32-43.

[26] California Integrated Waste Management Board, *Hitting the Goal Year: 2000 Annual Report* www.ciwmb.ca.gov/boardinfo/annualreport/2000/default.htm

[27] Institute for Local Self-Reliance (October 1999), *Cutting the Waste Stream In Half: Community Record-Setters Show How*, for U.S. Environmental Protection Agency, Document EPA-530-R-99-013. See www.ilsr.org/recycling/wrrs.html

[28] Roumpf, J. (1998). 'Wet- and dry -all over,' *Resource Recycling*, April 1998, 29-34; Kelleher, M. (1998). 'Guelph's Wet-Dry System. Up-to-date costs are now available,' *Solid Waste and Recycling*, Feb/March 1998, 34-35. Annual reports available from Wet-Dry Recycling Center, 333 Watson Road, Guelph, Ontario, Canada. Tel: 1-519-767-0598; Web: www.recycling.org/guelph/

[29] Argue, B. (1998). 'Sustaining 65 percent waste diversion,' *Resource Recycling*, May 1998, 14-21. Centre & South Hastings Recycling Board, 270 West Street, Trenton, Ontario, Canada K8V 2N3, Tel: 1-613-394-6266; Fax: 1-613-394-6850.

[30] Australian Capital Territory, Canberra (1996). 'A Waste Management Strategy for Canberra. No Waste by 2010', ACT Waste, PO Box 788, Civic Square ACT 2068, Australia. Phone: Website: www.act.gov.au/nowaste Contact: Graham Mannall, Waste Reduction Manager, Email: graham.mannall@act.gov.au

[31] Personal visit by Paul Connett. Videotape in progress.

[32] Provincia di Padua (1996). 'La Raccolta Differenziata Port a Porta. L'esperienza del Conzorzio di Bacino Padova Uno,' 1996.

[33] Parts of this section have been adapted from the GrassRoots Recycling Network's *Zero Waste Briefing Kit* (see *Resources* section).

[34] See website: www.thebeerstore.ca

[35] See website: www.epa.gov/oppt/epp/gentt/resource/total5.html

[36] See website: www.metrokc.gov/procure/green

[37] See website: www.pprc.org/pprc/pubs/topics/envpurch.html

[38] See website: www.collinsaikman.com

[39] See website: www.xerox.com

[40] See website: www.zeri.org/systems/brew.htm

[41] See website: www.fetzer.com, then see 'Fetzer Story' then 'Environmental Philosophy.'

[42] Durning, A. (1992). *How Much is Enough? The Consumer Society and the Future of the Earth.* Worldwatch Environmental Alert Series, W.W. Norton, NY, 1992.