

**Discussion Paper for  
Manpower Panel, Legislative Council, HKSAR**

**Recycling as an economic development tool**

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***Introduction***

Every day of the year Hong Kong feels the pressure of the unabated waste problem. In 2001, we disposed of more than six million tonnes of waste. The waste problem has certainly reached crisis level and has become one of the most urgent environmental problems Hong Kong has ever seen.

With this in mind, coupled with the urgency of the matter, Greenpeace has been working closely with Institute for Local Self-Reliance (ILSR) to work on the first comprehensive review of the current waste system in Hong Kong. ILSR is a US-based body, which has more than 27 years of expertise in designing integrated waste management systems for communities, with an aim of not only creating a sustainable environment but also economic development. As the unemployment in Hong Kong continue to shoot up, Greenpeace and ILSR would like to jointly present the report to this Panel as we consider recycling creates sustainable economic and employment for local community. We are also attaching the executive summary of the report. **ILSR estimated the jobs that would be created and sustained in recycling processing, manufacturing, and composting in Hong Kong if the Greenpeace/ILSR proposal was implemented to be over 7,400. Additional jobs may be created in outreach and education, in the retail sector or bottle redemption centers to support a deposit/refund system, and in new service industries supporting reuse.**

**Job creation from Recycling**

Recycling is an economic development tool as well as an environmental tool. Reuse, recycling, and waste reduction offer direct development opportunities for communities. When collected with skill and care, and upgraded with quality in mind, discarded materials are a local resource that can contribute to local revenue, job creation, business expansion, and the local economic base.

On a per-ton basis, sorting and processing recyclables alone sustain 10 times more jobs than landfilling or incineration. However, making new products from the old offers the largest economic pay-off in the recycling loop. New recycling-based manufacturers employ even more people and at higher wages than does sorting recyclables. Some recycling-based paper mills and plastic product manufacturers, for instance, employ on a per-ton basis 60 times more workers than do landfills.

Value is added to discarded materials as a result of cleaning, sorting, and baling. Manufacturing with locally collected discards adds even more value by producing finished goods. For example, new newsprint is worth 10 to 20 times the value of an equivalent weight of old newspapers. Each recycling step a community takes locally means more jobs, more business expenditures on supplies and services, and more money circulating in the local economy through spending and tax payments.

In the U.S., recycling has had a major impact on job creation in local and state economies:

- In North Carolina, recycling industries employ over 8,700 people. The job gains in recycling in this state far outnumber the jobs lost in other industries. For every 100 recycling jobs created, just 10 jobs were lost in the waste hauling and disposal industry, and 3 jobs were lost in the timber harvesting industry.
- A survey of ten northeastern states found that they employ 103,413 people in recycling.
- Massachusetts employs more than 9,000 people in more than 200 recycling enterprises. About half of these jobs are in the recycling-based manufacturing sector. These businesses represent more than half a billion dollars in value added to the state's economy.

The cumulative effect of recycling on the U.S. economy is impressive. From 1967 to 2000, the industry experienced annual growth rates of 8.3% and 12.7% in the number of jobs and gross annual sales respectively. In contrast, total U.S. employment during the same period averaged only 2.1% growth annually. The recycling industry outperformed fast food (compound annual growth in sales of 11.0% from 1970 to 1997) and health care (compound annual growth in expenditures of 10.3% from 1967 to 2000).

Product reuse is even more job-intensive than recycling. It is a knowledge-based industry, with a premium placed on accurate sorting and pricing, and good inventory management. One reuse company is Urban Ore in Berkeley, California. This company handles a broad range of reusable goods, from building materials to books and art. Materials are sorted and cleaned, and

### Job creation in the U.S. from reuse and recycling Vs. disposal

Type of Operation	Jobs per 10,000 tpy
<b>Product Reuse</b>	
Computer Reuse	233
Textile Reclamation	93
Misc. Durables Reuse	69
Wooden Pallet Repair	31
<b>Recycling-based Manufacturers</b>	
Paper Mills	19
Glass Product Manufacturers	29
Plastic Product Manufacturers	102
Conventional Materials Recovery Facilities	12
<b>Composting</b>	<b>4</b>
<b>Landfill and Incineration</b>	<b>1</b>

tpy = tonnes per year

Note: Figures are based on interviews with selected facilities around the U.S.

Source: Brenda Platt and Neil Seldman, *Wasting and Recycling in the United States 2000* (GrassRoots Recycling Network, Athens, Georgia: 2000), p 27.

### Comparison of jobs and gross sales growth for the recycling, fast food, and health care industries in the United States

	Jobs		Annual growth rate	Gross annual sales		Annual growth rate
	1967	2000		1967	2000	
Recycling industry	79,000	1.1 million	8.3	4.6 billion	236 billion	12.7
Fast food industry	NA	NA	NA	4.35 billion	140 billion	11.1
Health care industry	2.4 million	10.1 million	4.4	50.7 billion	1,299 billion	10.3

NA = Not available

Source: Institute for Local Self Reliance, 2002.

sometimes repaired. For the most part, what does not sell becomes scrap. Urban Ore calculates value-added monthly, which ranges from 30% to 60%. This reflects the large contribution its staff and handling system make to its monthly income.

The reuse industry competes with mass-marketed commodities such as diapers, tires, and plastic, glass, and metal drink containers. Each year Hong Kong consumers spend billions of dollars on these new products. Some of this money remains in the Region where the products are purchased, but most leaves the country for the home offices of the corporations. A handful of companies dominate the world markets for soft drinks, disposable diapers, and new tires.

By contrast, reuse industry alternatives — refillable bottle washing plants, cloth diaper services, tire retreading enterprises — create wealth and jobs for local communities. Such reuse companies tend to be small and locally owned and operated, providing local jobs and increased capital retention. Reuse is thus a tool for miniaturizing global and national economies, making them more sustainable.

Policies that support recycling can also create jobs in other sectors of the economy. Employment gains as a result of bottle bills can be significant. For example, the U.S. state of Iowa's (2000 population, 2,926,324) Department of Natural Resources reported a gain of approximately 1,200 jobs in retailing and distribution as a result of the State's bottle bill. In the U.S. State of Michigan (1980 population 9,262,078), a 1980 U.S. General Accounting Office (GAO) study determined that a total of 4,888 new jobs were created in Michigan as a direct result of the bottle bill. The gains in employment were offset by the loss of approximately 250 jobs in the container manufacturing, litter collection, and waste disposal sectors of the economy. However the net gain in the State was over 4,600 jobs.

ILSR estimated the jobs that would be created and sustained in recycling processing, manufacturing, and composting in Hong Kong if the Greenpeace/ILSR proposal was implemented to be over 7,400. ILSR calculated this figure based on Hong Kong recycling and composting of 6,300 tons of waste per day and the assumption that sorting and manufacturing facilities would be similar to those established in the U.S. The breakdown for these jobs include: 1,300 in sorting of recyclables; 1,400 in paper manufacturing; 3,500 in plastics manufacturing; 150 in metal manufacturing; 270 in glass manufacturing; 400 in reuse operations; and 400 in composting. Additional jobs may be created in outreach and education, in the retail sector or bottle redemption centers to support a deposit/refund system, and in new service industries supporting reuse.

## APPENDIX

### Executive Summary

#### Zero Waste: Replacing Waste Management with Discards Management in the HKSAR

Each year Hong Kong must dispose of mountains of waste. Total waste disposal in Hong Kong in 1999 was 8,126,000 tonnes. More than two-thirds of the domestic, commercial, and industrial materials disposed that year were comprised of paper, plastics, and putrescibles – materials that can be recycled or composted. Instead of focussing on the opportunities for cost-saving and job creation offered by recycling and composting these materials, the Government, however, has proposed building incinerators that will trade these opportunities for higher costs, substantial pollution, and environmental degradation.

Dwindling disposal capacity has become a pressing concern for Hong Kong. According to the Government reports, landfill capacity in the Region will be exhausted in 2015 or sooner. In order to address long-term waste management needs, the Environmental Protection Department (EPD) developed a "Waste Reduction Framework Plan." It states, "[w]e need to transfer emphasis from collecting and transporting waste to landfills for disposal to waste prevention and reuse of waste materials." To that end, numerous efforts in support of increased recycling have been implemented by Governmental agencies.

However, a look at current and planned spending for waste management activities reveals the Government's true priorities. In 1999, the Government's recurrent expenditure on waste management was \$1.5 billion. This does not include capital costs. Between April 1989 and March 2000, the Government invested more than \$10.2 billion in new waste management facilities. In order to address future disposal needs, the Government has reserved \$9,780 million of its Capital Works Reserve Fund for the development of two waste-to-energy incinerators with an overall capacity of 6,000 tonnes per day. Based on costs of similar incinerators around the world, the annual net cost to operate these incinerators will be an additional \$600 million. Furthermore, landfills will still be needed to handle residues from the incinerators, materials that are not suitable for burning, and waste production in excess of the incineration capacity.

In contrast to the billions of dollars the Government spends (and is planning to spend in the future) on waste disposal each year, Government investment in waste reduction, reuse, recycling, and composting is minimal. The Environment and Conservation Fund, a principle source for funding of waste reduction projects, received an initial \$50 million of capital upon establishment in 1994 and another \$50 million injection in 1998. The Government has touted its proposed 2002 injection of an additional \$100 million into the fund as a significant milestone. In summary, the Government's stated policy priorities and its spending priorities are exactly opposite.

In addition to consuming billions of dollars, development of waste-to-energy incineration facilities would create additional environmental pollution without creating a long-term solution for waste management. Waste incinerators can appear to be the answer to the problem of ever-increasing waste disposal. But to paraphrase Dr. Paul Connett, if incineration is the answer, you have asked the wrong question. Municipal waste incineration is **not** safe, it is **not** cost-effective, it is **not** sustainable, and it does **not** create net energy gains for society.

Incinerators are major – and in many areas the largest – sources of such pollutants as dioxin, lead, and other heavy metals released into the environment. Incinerators also release carbon monoxide, oxides of sulfur and nitrogen, hydrocarbons, and particulates into the air. Modern incinerators with sophisticated pollution control equipment trap some of the toxic metals in the fly ash – the residue

captured by the pollution control devices. Ironically, this means that the better the air pollution control, the more toxic the ash.

Furthermore, creation of incineration capacity would most likely lead to sustained wastefulness in Hong Kong's society. Incinerators need a minimum amount of garbage daily to operate properly and generate electricity. Because of their voracious need for discards for fuel, incinerators lock up the waste stream. They encourage increased product consumption and waste generation. They discourage waste reduction and sustainable methods of production and consumption. In addition, communities with incinerators still need landfills for ash disposal and for by-pass wastes. Ash can comprise about 25% by weight of an incinerator's throughput and must be landfilled. Thus, incineration means incineration plus landfill.

Describing an incinerator as a "resource recovery" or "waste-to-energy" facility is misleading. Incinerators recover few resources (with the exception of ferrous metals) and represent a net energy loser when the embodied energy of the materials burned is included in the accounting. When a ton of paper is burned for its heating value, it generates about 8,200 megajoules. When this same paper is recycled, it saves about 35,200 megajoules. Recycling other items typically present in MSW offers similar energy savings. Therefore, **incinerators waste energy** rather than turn waste into energy.

Greenpeace and the Institute for Local Self-Reliance (ILSR) propose Hong Kong radically change the focus of its system for handling discarded materials. This report details a blueprint for "zero waste" in Hong Kong. Critical components include programs and policies designed to:

- Reduce generation of discards (source reduction);
- Increase product reuse and repair;
- Create a source separation system for domestic, commercial, and industrial discards and construction and demolition debris;
- Establish an efficient collection system for separated materials;
- Support processing and market creation for recyclables; and
- Create composting systems for organic materials.

Greenpeace and ILSR believe that implementation of the programs proposed could result in reducing disposal needs to approximately 7,000 tonnes per day by the year 2011. This represents a greater disposal reduction than the Government proposed in its "Waste Reduction Framework Plan." Furthermore, these reductions would be achieved without relying on incineration.

In order to develop cost comparisons of the Greenpeace/ILSR proposal, ILSR developed a model of costs based on EPD data and estimated costs for proposed programs. This model compared costs for four scenarios:

1. Landfill disposal alone for all waste generated;
2. Development of 6,000 tonnes per day incineration capacity with landfilling of the remaining waste stream and incineration residuals;
3. Development of 6,000 tonnes per day incineration capacity, waste reduction of 20% by the year 2010, and landfilling of the remaining waste stream and incineration residuals; and
4. Full implementation of the Greenpeace/ILSR program.

The comparison of total operating costs for the waste management scenarios shows that the Greenpeace/ILSR proposal has the lowest costs in the long-term. Capital costs for the Greenpeace/ILSR proposal were also the lowest among all alternatives considered. The Government has reserved a staggering \$9,780 million of its Capital Works Reserve Fund for the development of waste-to-energy incinerators.

In contrast to the Government's incineration plans, with a capital cost of \$9.78 billion, the capital costs of implementing the Greenpeace/ILSR proposal will be much lower, at less than \$2 billion. At the bottom line, ILSR estimates cumulative expenditures for implementation of the proposal from the years 2002 through 2011, would be \$8 billion cheaper than a landfill-only waste management scenario and \$11 billion cheaper than implementation of the Waste Reduction Framework Plan.

Implementation of the Greenpeace/ILSR proposal would also decrease environmental and health effects from air and water pollution, reduce greenhouse gas production, conserve energy, create and sustain thousands of jobs, and encourage product manufacturers to market products which are less wasteful and/or easier to recycle.

For example:

- Fewer emissions originate at factories using recycled feedstock than at factories using virgin material. Recycling paper cuts air pollution by about 75%. Substituting steel scrap for virgin ore reduces air emissions by 85% and water pollution by 76%.
- Recycling reduces net emissions of greenhouse gases as compared to landfilling or incineration. For example, when using the extraction of raw materials as a reference point, recycling of 1,000 tonnes of newsprint reduces greenhouse gas emissions by 418 MTCE, whereas incineration of the same newsprint increases greenhouse gases by 286 MTCE and landfilling produces 275 MTCE.
- It takes 60% less energy to manufacture paper from recycled stock than from virgin materials.
- Sorting facilities for mixed recyclables sustain an average of 12 times as many jobs as maintained at landfills and incinerators handling the same amount of materials.
- A Japanese researcher reported that three out of five companies interviewed said that the enactment of Japan's Specified Household Appliances Recycling (SHAR) Law was a strong incentive for them to consider the environmental impact of their products.

Greenpeace and ILSR acknowledge that our proposal is very ambitious. However, it is not unattainable. Numerous jurisdictions in the U.S. and around the world have achieved impressive diversion levels for municipal solid waste (MSW). In the U.S., during 1996, Seattle, Washington diverted 44% of its MSW from disposal; Portland, Oregon diverted 50%; and Bergen County, New Jersey diverted 54%. The residents of Mokattam, Cairo, divert 90% of the trash they collect. Curitiba, Brazil, recycles two-thirds of its garbage. A neighborhood participating in the Advanced Locality Management program in Sahar, Andheri, Mumbai, India, reduced their garbage disposal by half within two years. Each of these jurisdictions has implemented some of the diversion programs proposed in this report but none has implemented the entire range of programs. We believe that if Hong Kong does so, it will not only be able to reduce its waste disposal to 7,000 tonnes per day cost-effectively by 2011, it will become a model for the rest of the world.