

**Preserve the Environment for  
Sustainable Development:**

***Reducing the  
accumulation of  
municipal solid  
waste***

Group: EN04

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## 1. Introduction:

In July 2013, the Legislative Council (LegCo) banned the proposal of the expansion of landfills in Tuen Mun and Tai Kwu Ling.<sup>1</sup> Again in November 2013, LegCo raised the issue of landfill extension in Tuen Mun and Tseung Kwan O, which was opposed strongly by the local residents.<sup>2</sup> Every day the landfills have to receive 9000 tonnes of municipal solid waste, yet they have limited capacity for waste to be disposed. The existing landfills in Hong Kong will be exhausted one by one by 2020.<sup>3</sup>

When compared to other major Asia cities like Tokyo, Seoul and Taipei, Hong Kong has a comparatively large municipal solid waste (MSW) load, exceeding around 40% of that of Seoul and 70% of that of Tokyo.<sup>4</sup> This makes us question: *Why is Hong Kong's municipal solid waste disposal rate much higher than those of other cities with similar economies? Is it sustainable to expand the landfills?*

Economically speaking, landfills are a good way of solving the waste problem. However, extension of landfills is only a short-term method to relieve Hong Kong's waste crisis. Expanding landfills will only encourage citizens to produce more waste. This method does not promote sustainable development in environmental protection.

Moreover, expansion of landfills gives rise to social unsustainability. There have been oppositions from the residents living near these landfills, complaining that the odour given off disgust them and worsen their health and quality of life. *(See Appendix 1)*

Therefore, incinerators are suggested to be built in Hong Kong. Incinerators are very effective in reducing MSW and relieving the overloading landfills in Seoul and Taipei. *(See Appendix 2)* However, they do not promote environmental sustainability. Toxic substances such as dioxins are formed during combustion, which results in health issues and worsen pollution problem. *(See Appendix 3)*

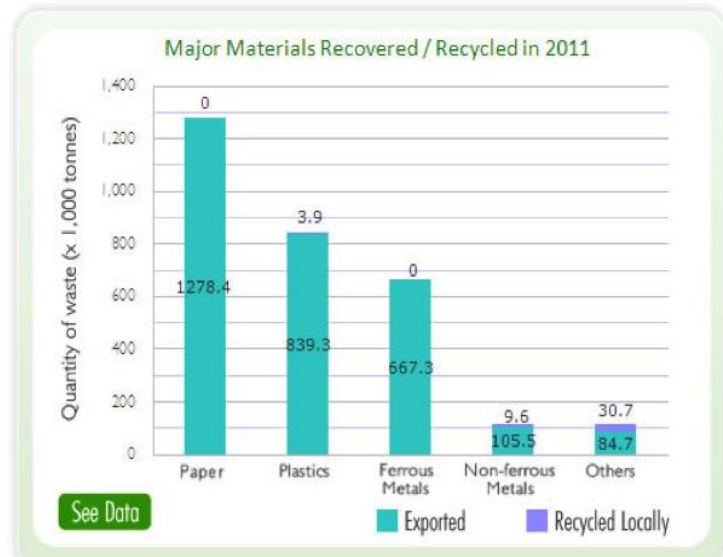
The ultimate cause of the waste problem in Hong Kong is that we produce too much waste. Hence, the **only** way to achieve sustainability in waste reduction is to reduce waste production. Landfills and incinerators are only short-term measures of waste treatment, and neither of them is sustainable. By reducing waste at source, sustainability can be achieved socially, economically and environmentally. This will be further discussed in our report.

## 2. Suggested Solutions

In order to promote sustainable development in waste reduction, there are **two** main ways: recycling and education.

### A. Recycling

Hong Kong has long been adopting the Programme on Source Separation of Domestic Waste and placing waste separation bins in the public (see *Appendix 11*) for the past ten years, but the effectiveness of such is far from satisfactory. According to fig. 1, most of the wastes are being exported, rather than being recycled locally.



With such a small geographical area, large population and unsustainable daily waste disposal in Hong Kong, enhancing recycling business is vital to alleviate the serious waste problem in Hong Kong. However, the lack of awareness and initiative of citizens hinder the development of recycling business. (See *Appendix 4*) Therefore, Hong Kong's recycling policies must be reinforced in order to achieve sustainable development.

Firstly, the government should force the citizens to sort wastes into 'waste resources', 'kitchen wastes' and 'general wastes', if not they will be penalized. **Law enforcement** is an effective method to achieve environmental sustainability in a society. Taipei and Seoul are successful in reducing daily municipal waste disposal significantly by carrying out this programme. (See *Appendix 5*) More collection centre in each district should be set up and more collection vehicles for collection general wastes should be prepared to incorporate with the charging scheme.

The principal of law enforcement is very similar to that of the Mandatory Garbage Sorting and Recycling Enhancement Project implemented in Taiwan. (See *Appendix 6*) By forcing citizens to recycle, this will definitely increase the amount of products that can be recycled, which will in turn relieve the problem of the overloading landfills. It is estimated if this scheme is established in Hong Kong, the amount of household waste will decrease from 6135 tons to 3197 tons per day. Thus, environmental sustainability can be achieved.

Also, this method does not require much money when compared to the costs of building incinerators. While minimizing the costs, the long-term positive effects are maximized. Once people have developed the recycling habits, the costs of this scheme can be kept low. Thus economic sustainability is achieved.

Secondly, the government should implement the **waste fee system**. The Environmental Protection Department carried out a public consultation on municipal solid waste charging last year and revealed that over 60% of the interviewee supported the waste charging in HK, and almost 60% favoured a quantity-based charging system. It can thus be seen that waste charging is not without its base of support in society as a whole. The volume-based waste fee system in South Korea and quantity-based waste fee system in Taipei are very successful in reducing the amount of wastes produced. *(See Appendix 7)* The HKSAR government must implement the **per bag trash waste fee system** efficiently with a strong stance in front of the urgent problem of landfill saturation within 3 years (before 2015). *(See Appendix 8)*

This policy can change the over consumption and disposal habit of HK citizens. Less waste will be produced and this preserves the environment. Even though the measure may not be effective to the wealthier people, as they do not care about the small sum of money paid, cultural sustainability can be achieved as the materialistic behavior of Hong Kong citizens can be improved.

Thirdly, an **economic incentive** scheme is needed in order to further increase the recycling rate in Hong Kong. After the implementation of 'Environmental Levy Scheme on Plastic Shopping Bags' in 2009, statistics have shown that the total disposal of plastic shopping bags has decreased greatly by 46.2%.<sup>8</sup> *(See Appendix 9)* This shows that an economic incentive policy works best in Hong Kong.

The government should support all housing estates to carry out voluntary incentive recycling scheme. In which, by taking recyclable wastes to the management unit of the housing estate, residents can be rewarded with a sum of money according to the weight of recyclable waste they give (e.g. \$1/kg).

We believe that environmental sustainability can be achieved if the reduction of waste is remarkably effective. Cultural sustainability can also be achieved as the notion of green living is firmly instilled into citizens.

Wise use of income collected can also help achieve sustainable development. The use of the levy income collected by the government was not announced. *(See Appendix 10)* We suggest that this amount of income should only be used for publicity on government's other environmental schemes such as the 'Bring Your Own Bag' scheme. This helps sustain the long-term effect of the economic incentive scheme and thus achieve the sustainable development of Hong Kong.

Fourthly, the government can refer to some successful recycling and reusing policies employed by other countries. For example, South Korean government provides long-term low interest loans to small recycling businesses to encourage citizens to set up recycling companies to help recycle waste. The number of recycling companies in the nation increased rapidly from 1 647 in 1999 to 4 375 in 2009, employing a total of 52 000 people.<sup>9</sup>

Providing long-term low interest loans can actually encourage citizens to invest in recycling business, as recycling companies in Hong Kong is definitely insufficient. More recycling companies can help recycle disposed products into new goods, which reduce the amount of waste disposed into the landfill.

Not only will the employment rate in Hong Kong increase, promoting recycling industry in Hong Kong is an act of sustainable development. More people will be aware of recycling materials in Hong Kong. Thus, sustainable development can be promoted both environmentally and socially.

In conclusion, Hong Kong's recycling policies have to be reinforced in order to further encourage citizens to recycle. The above-mentioned policies can effectively reduce waste production in Hong Kong and thus relieve our waste crisis.

## B. Promotional and Educational Work

Besides recycling, another way to achieve sustainable development in reducing waste in Hong Kong is by educating the public. We believe that sustainable development is not merely about the long-term effects of policies, but is also about instilling the idea of producing less waste in our future generations. Our effort alone is not enough; we must change the over-consuming pattern in Hong Kong so as to achieve cultural sustainability.

In order to let the public to expose more to the concept of recycling, the government should promote through different medium such as TV shows, Radio broadcast and the Internet.



The government should also educate the younger generations by setting up courses in their schools or organizing related talks. This way the children will understand the importance of recycling and thus they will develop a habit of recycling.

### **3. Conclusion:**

The crux of solving wastage in the long run is to promote sustainable development, which is 'reduction at source'. Incinerators and landfills are short-term measures only, which cannot exactly tackle with the cause of the waste crisis in Hong Kong. We believe that the only way waste can be reduced is by waste charging, fining policies and recycling enhancement as these encourages households to produce less waste. The proposed quantity base charge policy is feasible as it creates economic incentive thus it encourages citizens to reduce waste produce.

We also believe that promotional work and educating the public are essential in achieving sustainable development in Hong Kong. The notions of green living must be instilled in our future generations.

In conclusion, saturation of landfills cannot be relieved by expansion of landfills and building incinerators. Reduction at source is the only way that is sustainable.

## APPENDIXES:

### **Appendix 1: Sustainability of Landfills**

Hong Kong depends on landfill disposal far more than comparable economies in the region. South Korea stores 19% of its MSW in landfills, Taiwan 2%, and Singapore 1%, while Japan doesn't use landfills. In contrast, Hong Kong dumps 52% of its MSW in landfills.<sup>5</sup>

*Is extension of landfills of sustainable method to reduce waste?*

#### **1. Environmental sustainability**

Although Hong Kong's landfills are engineered to a very high standard and are well operated to meet high international environmental standards, extension of landfills is only a short-term method to relieve Hong Kong's waste crisis. Land is scarce in Hong Kong and there is no way the government can keep on exploiting Hong Kong's land supply in the future. This method does not promote sustainable development in environmental protection because this will only encourage citizens to produce more waste as they have the illusion that Hong Kong has more capacity for waste disposal. This will only worsen the waste crisis in Hong Kong and the vicious cycle repeats.

#### **2. Social sustainability**

Expansion of landfills results in more protests in the residential areas that are close to the landfills. There have been oppositions from the residents living near these landfills, complaining that the odour given off disgust them and worsens their quality of life and health. However, people should understand that extension of landfills concerns the overall interests of Hong Kong but not just a local dispute, as the chief secretary Carrie Lam had said. They should realize that this is one of their social responsibilities.

#### **3. Cultural Sustainability**

Knowing that the government has to expand the landfill sites, citizens will realize that Hong Kong's waste crisis is worsening and their materialistic behavior has to be changed. This promotes cultural sustainability, as people will start to appreciate the resources they have. The public may start to have intergenerational considerations because worsening Hong Kong's waste crisis will only increase the burden of our future generations.

### **Appendix 2: Incinerators in South Korea and Taipei**

In Seoul, there are four incineration facilities equipped with the resource-recovery system, which make them capable of recovering heat in the process of trash burning. The heat recovered is provided to the nearby households in the form of hot water.

In Taipei, there are three incinerators, burning 90 tons, 1500 tons and 1800 tons of unwanted waste per day respectively; they treat 46% of municipal solid waste in landfills. This is the main reason why 2% of these waste in Taiwan is dumped in landfills, as against Hong Kong's 52%.<sup>4</sup> It is a very effective method to reduce wastage and relieving the overloading landfills.



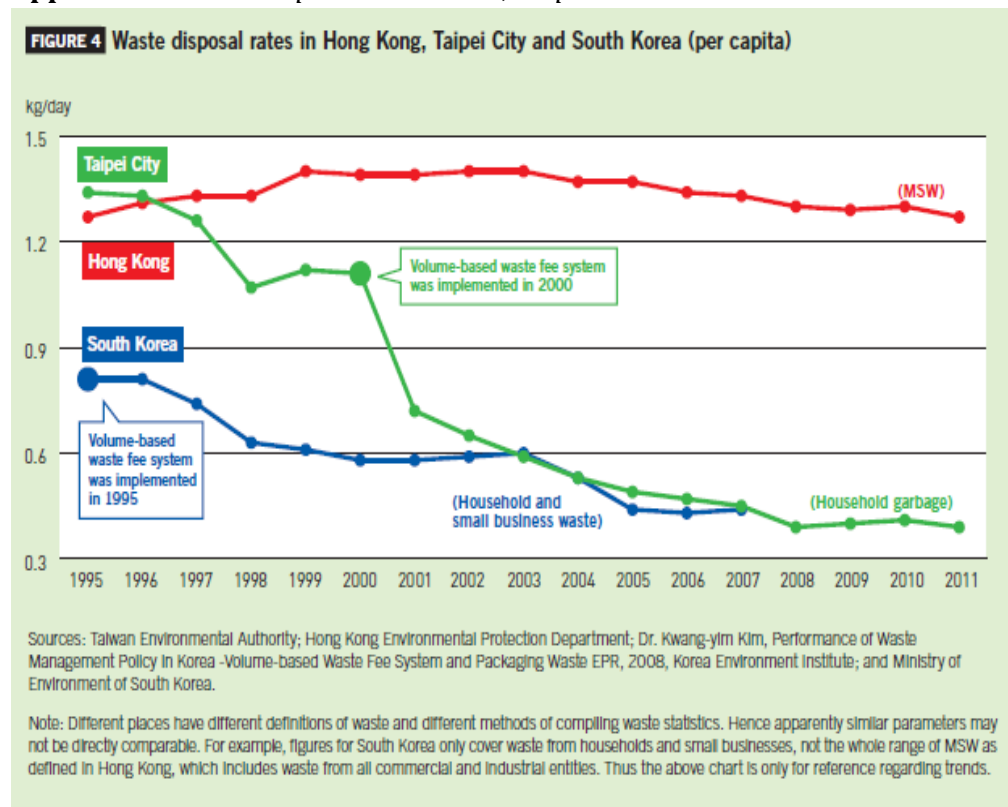
### Appendix 3: Disadvantages of incinerators

During combustion, when wastes interact with organic materials, toxic dioxin forms. Dioxins are highly toxic chemicals, which cause reproductive and developmental problems, damage to the immune system, and interfering with hormones, even causing cancer.<sup>6</sup> Greenhouse gas emissions from incinerators affect livelihood of people living near that area, causing health problems. Disputes, health problems, pollution and high cost affect the dynamic balance between the social, environmental and economic aspects of sustainable development, thus bringing harm to our future generations.

### Appendix 4: Lack of awareness and initiative of citizens on recycling

One reason for the unsuccessful Programme on Source Separation of Domestic Waste is that Hong Kong has only started education and promotion on sustainable development in recent years. So the older generations may not realize the importance of having a sustainable lifestyle and are inactive in participating the source separation programme. Another reason is that, there is a lack of incentives to stimulate people of the contemporary generation to take practical actions. So, even though they have abundant knowledge on sustainable development and environmental protection, they are not willing to take actions.

### Appendix 5: Waste disposal rates in HK, Taipei and South Korea<sup>4</sup>



### **Appendix 6: Mandatory Garbage Sorting and Recycling Enhancement Project**

In Taipei, household garbage sorting investigation, recyclable flow investigation, enterprise non-hazardous business waste recycling promotion and promotion proposal were implemented, and are enforced by the executing authorities. Executing authorities recyclables sales ratio increased from 23% in 2004 to 70% in 2009.<sup>10</sup> Also, It encouraged the public to participate in mandatory recycling and garbage sorting work measures, enhanced household waste sorting work progress.

From the experience of Taipei, we can see that this Mandatory Garbage Sorting and Recycling Enhancement Project is suitable for Hong Kong as well. According to a member of the legislative council Albert Chan Wai Yip, this scheme may be more effective than waste charging. Statistics show that the recycling rate of household wastage increased from 16% in 2005 to 40% in 2010. If the citizens recycle all waste, it can reduce 47.9% of the household waste per day.<sup>7</sup> By improving the recycling system, to reduce wastage, the department in charge can set different days in a week for recycling different wastes, for example recycling kitchen and food waste every Tuesday night, recycling all plastic related products every Thursday night, recycling all paper related products every Friday night and so on. If anyone contravenes the law, he would have to pay the fines.

### **Appendix 7: Effectiveness of Waste Fee System in South Korea and Taipei<sup>4</sup>**

	Effectiveness in South Korea	Effectiveness in Taipei
Before:	<ul style="list-style-type: none"> <li>• 72.3% municipal wastes were buried into the landfill, only 23.7% recycled</li> <li>• 1.33 kilogram of municipal wastes was produced per day per person</li> </ul>	<ul style="list-style-type: none"> <li>• Total solid wastes per day: 2931 tons (Jan-Jun 2000)</li> <li>• Total solid wastes per person per day: 1.11kg</li> </ul>
After:	<ul style="list-style-type: none"> <li>• &gt;60% of daily municipal wastes were recycled</li> <li>• 1.03 kilogram of municipal wastes was produced per day per person</li> </ul>	<ul style="list-style-type: none"> <li>• Total solid wastes per day: 1834 tons (Jul-Dec 2000) (-37%)</li> <li>• Total solid wastes per person per day: 0.69kg</li> </ul>

### **Appendix 8: Effectiveness of Waste Fee System in Hong Kong**

The Volume-based Waste Fee System is similar to the proposed Quantity-based System municipal solid waste charging. It is an effective and fair policy to implement as citizens pay what really produced, and as Hong Kong citizens have similar consumption and disposal habits as Koreans. Moreover, economic incentives could be created while greatly reducing wastes disposed.

Although international experience shows that a quantity-based charging system provides sufficiently high economic incentive for the public to classify and recycle waste while producing less waste, we believe that the per bag trash waste fee system suits Hong Kong better. It is because Hong Kong is densely populated and some buildings do not have a proper system to collect wastes. Besides, there are around 2 million flats in Hong Kong, producing around 6000 tons of wastes per day. If we take Taipei as an example, this would require at least 11,000 collection points for rubbish. The garbage trucks required are more than the government can possibly provide. Another problem is that the time (6-12pm) may not be sufficient for collecting all wastes, and the process may not be efficient.

### **Appendix 9: Findings of the Landfill Survey on Disposal of Plastic Shopping Bags<sup>8</sup>**

#### **Findings of the Landfill Survey on Disposal of Plastic Shopping Bags**

<b>Retailer Category</b>	<b>End 2005</b>		<b>Mid 2009</b>	
	<b>Mn/Yr</b>	<b>%</b>	<b>Mn/Yr</b>	<b>%</b>
Supermarkets	1,267	14.58%	488	10.43%
Convenience Stores	499	5.74%	90	1.92%
Bakeries and Cake Shops	530	6.10%	262	5.60%
Cooked Food Outlets	387	4.45%	327	6.99%
Newspaper and Magazine Bags	298	3.43%	121	2.59%
Medicare and Cosmetic Bags	195	2.24%	79	1.69%
Department Stores and Home Accessories Shops	158	1.82%	48	1.03%
Fashion and Footwear Shops	106	1.22%	35	0.75%
Books, Stationeries, Gifts and Novelties Shops	61	0.70%	21	0.45%
Electrical and Telecom Shops	35	0.40%	10	0.21%
Others	5,155	59.31%	3,197	68.34%
<b>Total</b>	<b>8,691</b>	<b>100.00%</b>	<b>4,678</b>	<b>100.00%</b>

## Appendix 10: A table showing the levy income collected

*Table 1:  
Levy Income and PSBs Distributed by  
Registered Retailers under the Levy Scheme  
(July 2009 to March 2011)*

Period	Levy Income (approx.)	PSBs Distributed Equivalent (approx.)
7 July to 30 September 2009 (first quarterly return)	\$6.7 million	13.4 million
1 October to 31 December 2009 (second quarterly return)	\$6.4 million	12.8 million
1 January to 31 March 2010 (third quarterly return)	\$6.7 million	13.4 million
1 April to 30 June 2010 (fourth quarterly return)	\$5.7 million	11.4 million
<b>Full first-year total</b>	<b>\$25.5 million</b>	<b>51.0 million</b>
1 July to 30 September 2010 (fifth quarterly return)	\$6.3 million	12.6 million
1 October to 31 December 2010 (sixth quarterly return)	\$6.2 million	12.4 million
1 January to 31 March 2011 (seventh quarterly return)	\$6.5 million	13.0 million

## Appendix 11:

Since 1998, the government has been placing waste separation bins throughout the community to collect recovery materials. Currently, there are over 44 000 waste separation bins being placed by the public areas such as the roadsides and in parks.

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