

Legislative Council
of the
Hong Kong Special Administrative Region

Delegation of the Panel on Environmental Affairs

**Report on the duty visit to the Republic of Korea
to study its experience on waste management**

1 to 5 April 2013

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Chapter 1 — Introduction

1.1 Purpose of the report

1.1.1 A delegation of the Panel on Environmental Affairs ("the Panel") of the Legislative Council visited Seoul, Republic of Korea (commonly known as "South Korea"), from 1 to 5 April 2013 to study the country's experience in various aspects of waste management. This report presents the main findings and observations of the delegation.

1.2 Background of the visit

1.2.1 Waste reduction and waste management are great challenges for Hong Kong. Hong Kong's per capita quantity of waste generated on a daily basis is higher than that of many developed economies and the landfills in the territory will also be exhausted one by one by 2020. The Panel has been monitoring the efforts made by the Administration in addressing these challenges and has urged the Administration to conduct a comprehensive review and to put forward a series of waste management strategies.

1.2.2 As highlighted in the 2013 Policy Address, the Administration is vigorously pursuing a multi-pronged waste management strategy and developing sustainable end of pipe treatment for waste, with a focus on waste reduction at source while progressively implementing Producer Responsibility Schemes and the polluter-pays principle to boost the recovery and recycle rates of resource materials. The Panel noted that a blueprint, with the aim to map out a long-term comprehensive strategy and action plans for waste management, would be rolled out by the Administration in 2013¹.

1.2.3 At its meeting on 25 February 2013, the Panel was advised that the Administration was planning to visit Seoul, South Korea between 2 and 5 April 2013 to learn more about the country's experience in waste management in respect of waste reduction, waste recycling, and treatment infrastructures. The Administration invited the Panel to consider whether to conduct a similar visit together.

¹ The blueprint, entitled "Hong Kong Blueprint for Sustainable Use of Resources 2013-2022", was released in May 2013.

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1.2.4 Seoul, South Korea, has been very successful in achieving waste reduction and it shares many similarities with Hong Kong in population density and built environment. Its path towards success will provide good reference for Hong Kong. On this basis, the Panel considered it worthwhile to undertake a visit to the city to obtain first-hand information on South Korea's experience in waste management so as to enable members to grasp the latest development on the subject and facilitate their deliberations on the issues concerned in examining the waste management blueprint.

1.2.5 On 1 March 2013, the Panel obtained the House Committee's permission to undertake the duty visit to Seoul.

1.3 Objectives of the visit

1.3.1 The duty visit aimed to study the following areas –

- (a) the South Korean Government's policies and measures on waste reduction, waste recycling and waste treatment infrastructures;
- (b) response of the public, non-governmental organizations and members of the local municipal council to waste management policies and waste treatment facilities;
- (c) measures adopted by the South Korean Government to address issues of concern or problems relating to waste reduction, waste recycling and waste treatment facilities; and
- (d) the business and employment opportunities made available by recycling operations developed by the South Korean Government and non-governmental organizations.

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1.4 Membership of the delegation

1.4.1 The delegation comprised the following members –

Panel members

Hon Cyd HO Sau-lan
(Chairman of the Panel and leader of the delegation)
Hon Christopher CHUNG Shu-kun, BBS, MH, JP
(Deputy Chairman of the Panel)
Hon Vincent FANG Kang, SBS, JP
Hon CHAN Hak-kan, JP
Hon CHAN Kin-por, BBS, JP
Hon Claudia MO
Hon Gary FAN Kwok-wai
Hon Charles Peter MOK
Hon KWOK Wai-keung
Dr Hon Helena WONG Pik-wan
Dr Hon Elizabeth QUAT, JP
Hon Tony TSE Wai-chuen

Non-Panel members

Hon Emily LAU Wai-hing, JP
Hon Tommy CHEUNG Yu-yan, SBS, JP
Hon Frederick FUNG Kin-kee, SBS, JP
Hon Paul TSE Wai-chun, JP
Hon WONG Yuk-man

1.4.2 Ms Miranda HON, Clerk to the Panel, Miss Tiffany NG, Research Officer, and Miss Lilian MOK, Council Secretary, accompanied the delegation on the visit.

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1.5 Visit programme

1.5.1 The visit programme of the delegation commenced on 1 April 2013 and ended on 5 April 2013. It started one day earlier than the Administration to meet with the relevant committee of the Seoul Metropolitan Council and non-governmental green groups. The delegation was joined by the delegation of the Hong Kong Government on 3 April 2013 and the two delegations had the same itinerary throughout the rest of the visit. The detailed visit programme and a list of the organizations and persons met by the delegation are in **Appendices I and II** respectively. The list of the Hong Kong Government delegation is in **Appendix III**.

Chapter 2 — Waste management policies and related treatment infrastructures

2.1 Overview of waste management policies in South Korea

2.1.1 South Korea has been pursuing a sustainable waste management strategy since 1990s, focusing on demand-side management for reducing waste generation at source. At that time, a number of new policy initiatives were introduced with the aim of reducing waste generation prior to disposal. This strategy contrasts with the supply-side waste management policies adopted before 1990s, which had been confined to expanding facilities for the post-treatment of waste to provide a safe and clean environment.

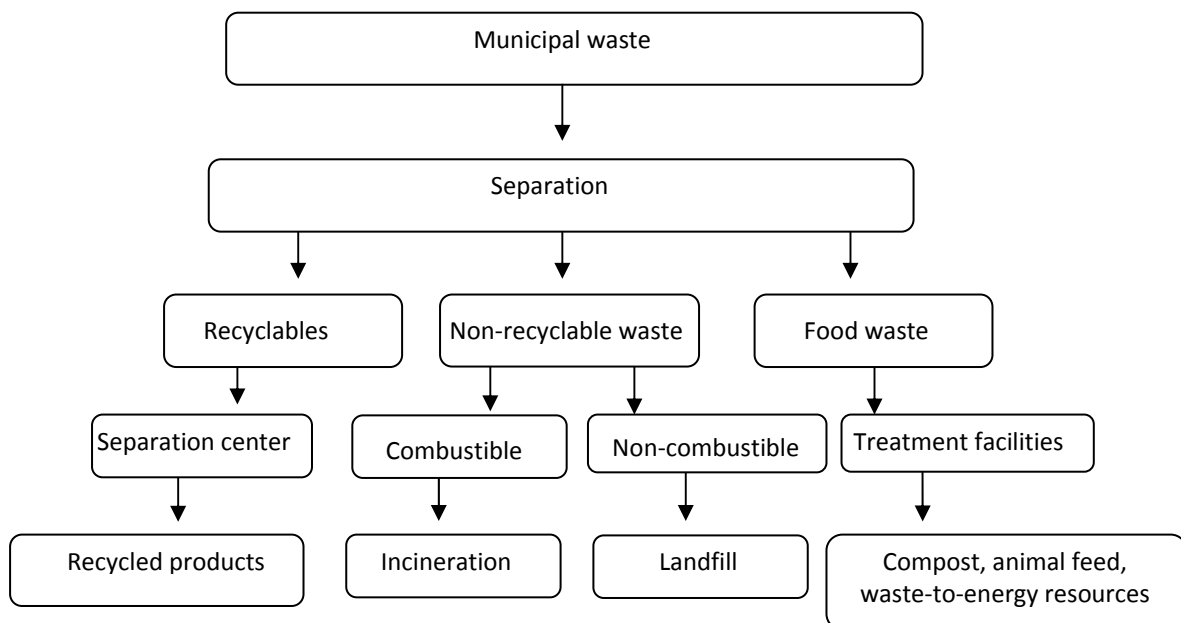
2.1.2 With the shift of the Government's policy goal from maximizing treatment facilities to minimizing waste, the responsibility for waste management has not only been borne by local governments but also shared between consumers and producers. This extended responsibility has contributed to the enhancement of people's awareness of waste management and environmental issues in the country. Since the early 2000s, the South Korean Government has expanded the waste management policy scope to reusing waste as an energy resource.

2.1.3 In South Korea, waste management is primarily governed by the *Wastes Control Act* enacted in 1986 and amended in 2007, and the *Act on Promotion of Saving and Recycling of Resources* enacted in 1992 and amended in 2008. The former sets out the basic framework for waste management, including classification of waste, responsibilities of national/local governments and citizens, standards and rules for waste disposal and treatment procedures, etc. The latter stipulates the framework for waste recycling such as the basic recycling plans, the roles and responsibilities of enterprises and citizens for promoting waste recycling, and the provisions concerning waste reduction. There are also separate laws governing other waste management matters, e.g. disposal of electric/electronic equipment and vehicles, construction waste recycling, and management of hazardous waste.

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2.1.4 The Ministry of Environment is the government agency in charge of the overall environmental policies in South Korea. It is responsible for: (a) enacting and amending environmental laws and regulations; (b) drafting and implementing mid to long-term comprehensive measures for environmental conservation; (c) providing administrative and financial support to local governments on policy implementation; and (d) setting out plans and frameworks for waste reduction, recycling, and recovery of energy through its policy branch, the Resource Recirculation Bureau. To facilitate policy implementation, the Ministry of Environment has established various subsidiary public organizations to, for example, operate waste treatment facilities and provide necessary support to the green industry.

2.1.5 The waste collection and treatment process for municipal waste in South Korea is shown below –



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2.1.6 Currently, South Korea is pursuing a "4Rs strategy", focusing on the following directions –

- (a) waste reduction;
- (b) expansion of goods reuse;
- (c) maximization of waste recycling; and
- (d) recovery of energy from waste.

2.1.7 In 2011, 63% of the municipal/domestic waste in Seoul was recycled, 25% incinerated and 12% landfilled. Major policy initiatives in respect of the above directions and the relevant infrastructures and facilities visited by the delegation are set out in the rest of this chapter.

2.2 Waste reduction

2.2.1 In South Korea, a number of policy initiatives are in place aiming to minimize waste generation. A well-known policy is the volume based waste fee system introduced nationwide in 1995 which applies to general household waste. In recent years, the volume based system has been extended to food waste.

Volume based waste fee system

Household waste

2.2.2 Before 1995, waste collection in South Korea was charged at a fixed rate through property tax or monthly fee regardless of the volume of wastes disposed of. The volume based waste fee system (also known as the pay-as-you-throw scheme) was introduced under the producer/polluter-pays principle requiring users or polluters to pay the disposal cost according to the quantity of waste they produce. The main objectives of the volume based waste fee system are –

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- (a) to impose waste treatment cost on each polluter based on the amount of waste generated; and
- (b) to provide free collection service for recyclable waste, thereby reducing waste generation at source and encouraging the collection of recyclable waste.

2.2.3 Under the volume based waste fee system, waste generated by households and small commercial sector is disposed of according to the types of waste, as follows –

Source	Type of waste	Use of pre-paid garbage bag	Cost borne by source
Households & small commercial sector in urban area ²	Household waste (non-recyclable)	✓	✓
	Recyclable waste	×	×
	Bulky waste	×	✓
	Construction/demolition debris	×	✓

Source: Ministry of Environment and Korea Development Institute

2.2.4 Pre-paid garbage bags are used to collect general household waste. They come in different colors for different regions and are purchased from supermarkets at prices determined by local governments. The prices already include the cost of collection, transportation and disposal of waste.

2.2.5 At the early stage of the implementation of the system, household waste collected in pre-paid garbage bags was disposed of at particular time and points. At present, it is disposed of at any time at designated points. Recyclable waste is placed in separate receptacles for collection by local governments or private haulers free of charge. Bulky items and construction/demolition debris are to be disposed of separately at polluters' own cost.

² The system is applicable to residential and commercial sectors, schools, government and commercial waste of less than 300 kg per day. Large-scale businesses that produce more than 300 kg of waste per day are required to arrange waste collection on their own.

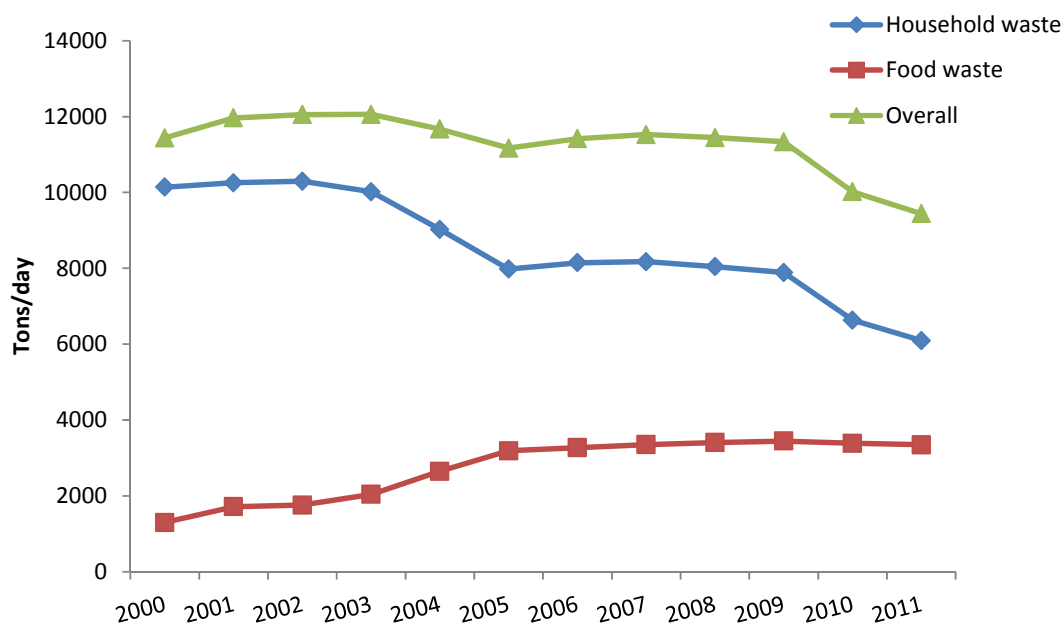
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2.2.6 The South Korean Government has introduced different measures to complement the policy implementation. For instance, it has provided funding to each city and district to set up additional recycling facilities, install adequate monitoring equipment and deploy additional manpower to prosecute people who do not use pre-paid garbage bags to dispose of their waste. There are voluntary groups from residents' organizations and non-governmental green groups which monitor fly-tipping. Any reporting on fly-tipping may be rewarded with up to 80% of penalty. Extensive publicity and education programmes were also launched at the inception stage to educate the public on the use of pre-paid garbage bags and classification of recyclables.

2.2.7 The volume based waste fee system has proven to be successful in reducing waste. It has greatly changed the lifestyle of people and the conduct of companies. People have become more ready to bring their own reusable shopping bags and to purchase second hand goods and refillable products. Companies have been driven to adjust their production and marketing practices to reduce unnecessary packages and waste as far as possible. These changes have led to the rapid growth of the recycling industry in South Korea.

2.2.8 According to the Seoul Metropolitan Council ("SMC"), the household waste generation in the city of Seoul has dropped by 40% from the average of 10 142 tons/day in 2000 to the average of 6 093 tons/day in 2011. The figure below depicts the trend of municipal waste generation in Seoul.

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Source: Seoul Metropolitan Council

Food waste

2.2.9 Food waste has long been a significant problem in South Korea owing to its traditional style of large number of small dishes. Food waste not only includes throwing away cooked food but also all the food thrown away during the process from production to distribution. Over the years, the South Korean Government has launched various programmes which aim to raise the public awareness on the matter. Restaurants are encouraged to use less and smaller side-dish plates and adopt eco-friendly menu. However, food waste remains a persistent problem. As indicated in the above figure, food waste generation exhibits a rising trend in Seoul.

2.2.10 In the past, collection of food waste in residential areas was either free or charged at a flat rate among local regions. In the light of the deteriorating food waste problem, the South Korean Government announced in 2010 the introduction of the pilot volume based food waste fee system, in a move to make residents accountable for the food waste they generate. This pay-as-you-throw scheme has been implemented in more than 50% of the municipalities across the country today and will be

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extended to 144 local regions in phases. The scheme has been fully implemented in the city of Seoul starting from 1 June 2013.

2.2.11 The volume based food waste fee system is implemented through one of the following three ways by local governments: (a) using pre-paid garbage bags; (b) using garbage bins attached with chips or stickers purchased from grocery stores; or (c) using collection bins equipped with radio frequency identification ("RFID") chips.

2.2.12 To better understand the operation of the volume based waste fee system for household waste and food waste, the delegation visited Geumcheon-gu, a district in Seoul.

Visit to Geumcheon-gu

2.2.13 The delegation was received by the Mayor of Geumcheon-gu and members of the Geumcheon District Council ("GDC"). Members had the opportunity to listen to their experience and discuss with them the volume based waste fee system.



The delegation exchanged views with the Mayor of Geumcheon-gu and members of the Geumcheon District Council

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The delegation took a group photo with Mr CHA Sung-soo, Mayor of Geumcheon-gu (fifth from left in front row), Mr KANG Tae-seob, Vice Chairman of the Geumcheon District Council (fourth from left in front row), and other members of the District Council

2.2.14 The delegation learned that there were guidelines on source separation of waste issued by the regional government. Residents of high-rise buildings have to dispose of their general household waste and recyclable waste separately in designated public collection containers placed in public area of the building, whereas residents of low-rise buildings have to dispose of their source separated waste in front of the entrance of their residence.

2.2.15 According to GDC, pre-paid garbage bags used for discharging household waste come in various sizes ranging from two to 100 liters. For a 20-liter garbage bag commonly used by households, it costs about KRW 370 (i.e. HK\$2.5³). The price of a 100-liter bag is about KRW 1920 (i.e. HK\$13). The delegation viewed two samples of pre-paid

³ Conversion is based on the average exchange rate of HK\$0.0068 per South Korean Won in June 2013.

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garbage bags, one for household use and the other for commercial use, which are shown below –

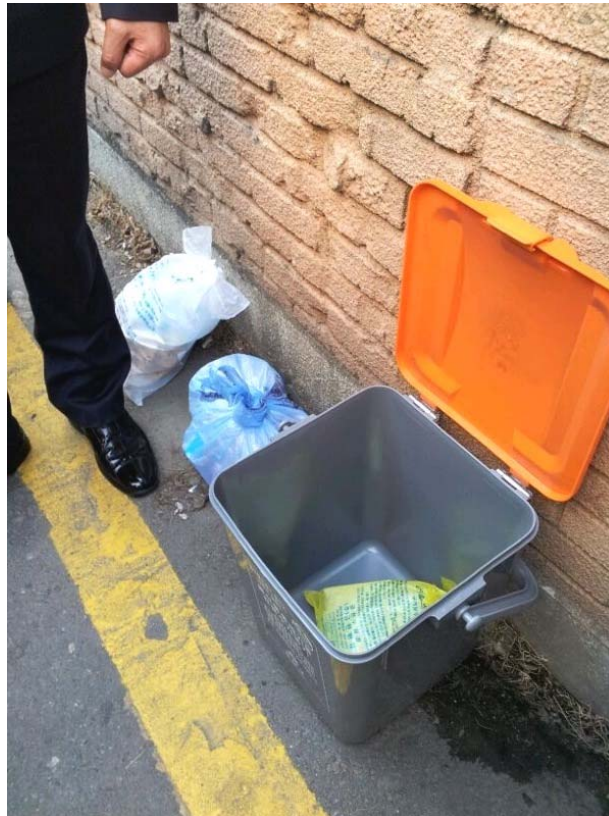


Pre-paid garbage bags for household use (left) and commercial use (right)

2.2.16 Recyclable waste is collected free of charge. For bulky items such as home electronics and furniture, they have to be separately disposed of. Residents are required to purchase appropriate stickers from the local government or private haulers and attach them to the bulky waste for disposal.

2.2.17 While the system is operated under the producer/polluter-pays principle, the delegation notes that to ease the financial burden of low income families, pre-paid garbage bags are distributed by the local government to low income groups free of charge.

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The delegation received an introduction on the volume based waste fee system in Geumcheon-gu

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2.2.18 With respect to food waste, Geumcheon-gu is currently running the pilot system using the RFID technology with the following features –

- (a) the local government has prepared specially designed collection bins with a magnetic card reader;
- (b) each household is given a magnetic card containing information about the household. When households dispose of their food waste, they touch the card reader with their card and the information about the household will be read; and
- (c) the weight of the food waste is then measured and the monthly data will serve as the basis for charging fees to the household.



Collection bins installed with RFID chips to keep track of food waste generation by individual households

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The delegation was briefed on the operation of the RFID based food waste disposal system

2.2.19 The delegation observed the operation of the RFID based food waste disposal system. Members were told that after the implementation of the system, there had been a 30% reduction in food waste in several months. They also noted that a number of districts in South Korea had opted to implement this kind of disposal system on a trial basis. The system will be extended to more cities in future as it enables local governments to keep track of garbage disposal data at the household, estate, and district levels.

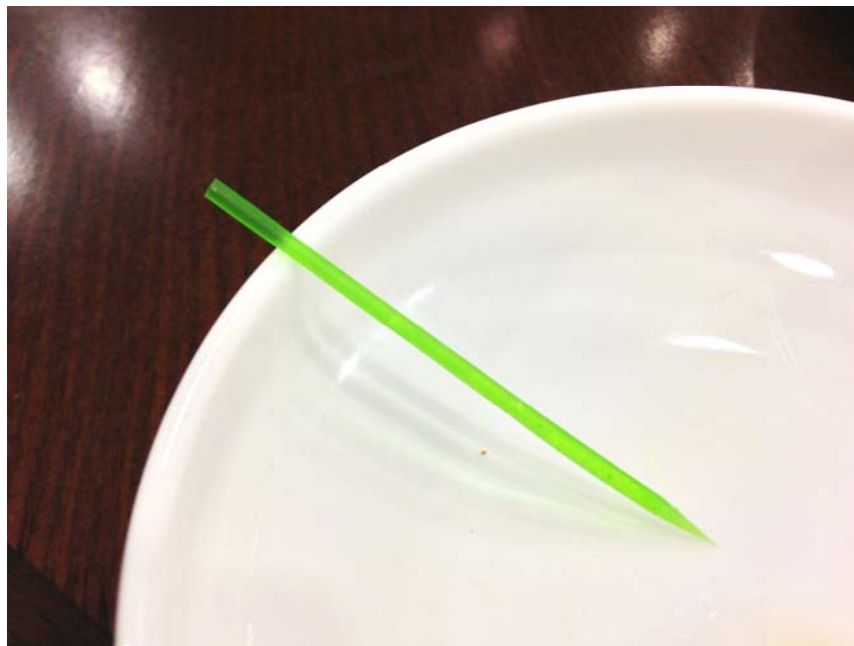
Restricted use of disposable products and excessive packaging

2.2.20 To reduce waste generation, the use of disposable products (i.e. products designed to be used only once) by businesses has been subject to the regulation of the *Act on the Promotion of Saving and Recycling of Resources* since 1994. The Act prohibits the use of disposable goods such as paper cups, wooden chopsticks and toothpicks, and plastic table cloths in restaurants and cafeterias. In addition, free

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distribution of certain disposable products such as shopping bags, razors, toothbrushes, toothpastes, etc is disallowed.

2.2.21 The delegation notes that with the restricted use of wooden toothpicks, restaurants in Seoul commonly provide environmentally-friendly toothpicks to customers. These toothpicks are made from starch material and are biodegradable.



Common use of biodegradable starch toothpicks in restaurants

2.2.22 To reduce the environmental impact caused by over-packaging, the South Korean Government has banned the use of packaging materials that are difficult to recycle, such as those containing polyvinyl chloride lamination, shrink packaging and coating. The use of packaging materials made from synthetic resins is also gradually phased out.

2.2.23 Furthermore, the vacant space after packaging and the number of packaging layers in a box or container are regulated in South Korea. Currently, the vacant space is restricted to 10% to 35% of the packaging capacity (subject to the type of products), while the number of packaging layers in a box or container is limited to two. The restrictions are applicable to products like food, cosmetics, detergents, medicine concomitants, clothes, etc.

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2.3 Expansion of goods reuse

2.3.1 Reuse of goods is actively promoted in South Korea. At the manufacturing level, there is a deposit and refund system under which producers and importers of beverages and soft drinks add a deposit fee to the product price. The deposit fee is refundable to consumers upon return of used bottles. Reuse is also facilitated at the retail level through the development of flea markets for selling or exchanging used or unused goods. In Seoul, there are various flea markets such as the second hand market in Ttukseom and Gwangwhamun Market, each of which attracts tens of thousands of vendors and visitors every year.

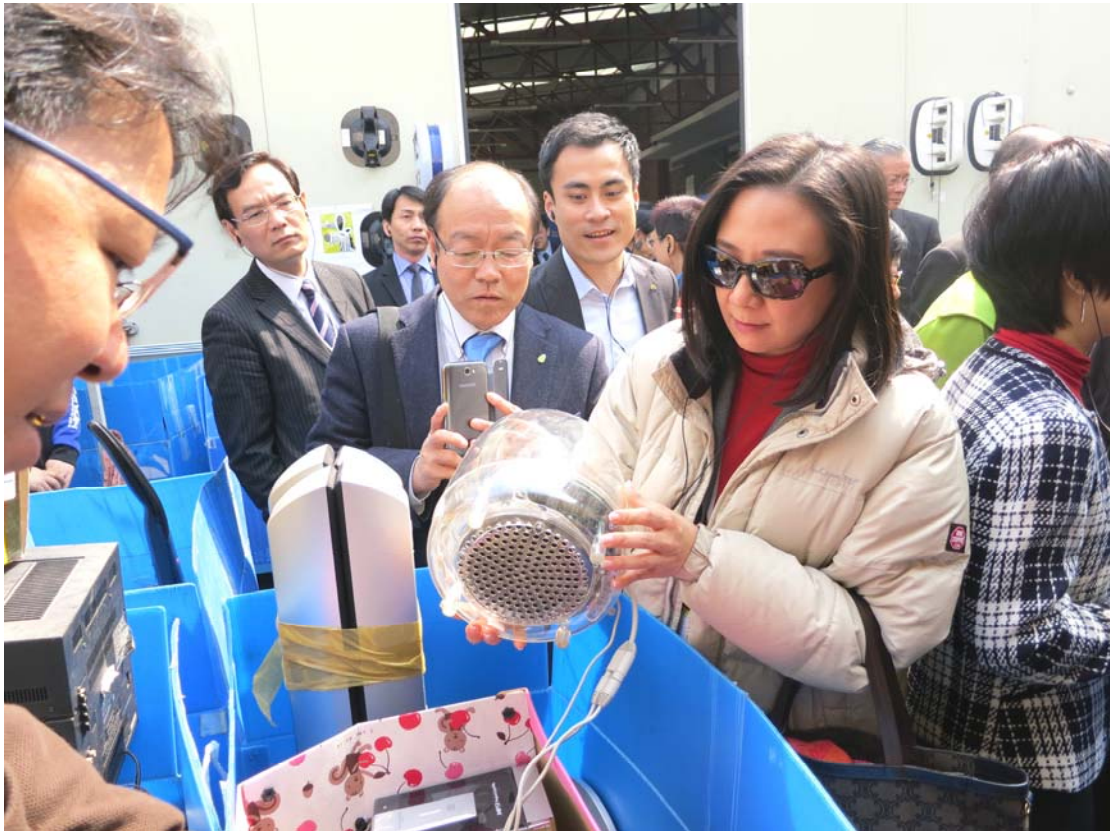
2.3.2 There are also social enterprises established in South Korea to promote green business and second hand market. In this connection, Beautiful Store is the first and leading registered social enterprise in the country promoting the reuse and recycling of used goods through donation, sharing and volunteering. It provides opportunities to exchange usable but unused goods. During its stay in Seoul, the delegation paid a visit to the Beautiful Store.

Visit to the Beautiful Store

2.3.3 The delegation notes that since the opening of its first shop in 2002, the Beautiful Store has developed into a sizable enterprise consisting of 115 shops across the country. The Beautiful Store sells second hand goods at low prices and the profits are used to help the needy through various public campaigns. It has its own brand of fair-trade products, including coffee, chocolate, jam, snack, etc. It is also the pioneer which opens up new markets inside and outside South Korea.

2.3.4 The delegation visited the logistics centre of the Beautiful Store. Second hand goods donated by people in the district are sent for further processing, including product separation, inspection, price tagging and repair (if necessary). After processing, the donated products are distributed to the Beautiful Store shops in the district for charity sale.

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Visit to the logistics centre of the Beautiful Store

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The delegation received a briefing in the head office of the Beautiful Store

2.3.5 After touring the logistics centre, the delegation visited the head office of the Beautiful Store and received a briefing there. The delegation learned that the Beautiful Store stressed the following core values –

- (a) Sustainability;
- (b) Trust;
- (c) Communication;
- (d) Participation; and
- (e) Positive changes.

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2.3.6 The core values are demonstrated in the organization's strong community ties and volunteering. The delegation was advised that the operation of the Beautiful Store was entirely funded by public donation and well supported by volunteers. There is only one salaried staff in each shop while the rest of the staff are voluntary workers. Moreover, 80% of the shops across the nation are rent-free, and some were even donated by the public. Apart from selling donated goods and fair-trade products, the Beautiful Store is also a market place for ethical products produced by social enterprises, eco-friendly organizations and people with disabilities. The delegation was highly impressed by the extensive scale of the Beautiful Store and the powerful community support it received.

2.3.7 Following the briefing in the head office, the delegation visited the adjoining Beautiful Store shop to view the second hand products donated by the public and other goods. They ranged from books, stationery, clothing to home appliances.



Visit to the Beautiful Store

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Group photo taken after visiting the Beautiful Store Head Office

2.4 Maximization of waste recycling

2.4.1 The introduction of the volume based waste fee system has greatly promoted waste recycling in South Korea. In addition to general recyclable items such as paper, plastics and glasses, there are food waste recycling, construction waste recycling, and recycling of electronics and packaging waste at the producer level under the Extended Producer Responsibility ("EPR") System.

Separate collection of recyclables

2.4.2 Under the volume based waste fee system, recyclable waste is separately disposed of for collection by local governments free of charge. For apartments, recyclables are generally separated into five to six types

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(e.g. paper, bottles, cans, metals and plastics), whereas for houses, recyclables are separated into two to three types.



Receptacles for collection of different types of recyclable waste

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2.4.3 Collected recyclable waste will undergo re-separation in waste separation centres. In Seoul, there are 14 separation centres established by the Government: two are operated by district offices and the other 12 are commissioned to the private sector for management. The separation centres altogether have a capacity of 645 tons/day. After re-separation, the recyclables will be sent to the recycling centres for further processing. During the visit in Seoul, the delegation paid a visit to a government-run waste treatment plant in Gangbuk-gu, the Gangbuk Waste Recycle Treatment Plant.



Re-separation of plastic waste in the Gangbuk Waste Recycle Treatment Plant

Visit to the Gangbuk Waste Recycle Treatment Plant

2.4.4 The Gangbuk Waste Recycle Treatment Plant was established in 2007. It is located in a cave and surrounded by a forest park covering a land area of over 8 000 square meters. The delegation was told that the Plant was located far from the residential areas so as to minimize the impact of the noise and smell generated from its operation to the residents nearby. The Plant is government-run and managed by civil servants. There are about 120 staff, with some of them being professionals

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overseeing the operation and some being workers. Some of the workers are people with disabilities or from the disadvantaged groups. Hired workers are responsible for treating 15 categories of disposed recyclable materials, including paper, glasses, tins, iron, plastics, styrofoam, used clothes, fluorescent tubes and electrical appliances. The Plant has a treatment capacity of 60 tons/day. Treated recyclables are partly taken up by local manufacturers to meet their recycling obligation and partly for export.

2.4.5 The delegation learned that the local government of Gangbuk-gu had provided substantial support to the Plant. For instance, it had granted land for its establishment and provided regular funding for its operation, including staff cost. Sale proceeds could generally finance about 60% of the Plant's operation while the remaining 40% was funded by government subsidies.



The delegation received a briefing on waste separation and recycling

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Reception area of collected recyclable waste



Separation of waste into different categories by workers

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2.4.6 The delegation visited the Treatment Plant to observe the waste separation process and the Education Corner. The latter showcases different recyclable materials and recycled products. In particular, the delegation was shown a recycled energy source called "refuse plastic fuel" which was converted from plastic waste (e.g. plastic bags for packing instant noodles). The delegation was told that this energy source was an alternative to fossil fuel and used in certain manufacturing factories. In South Korea, this initiative is seen to be of economic value. However, the delegation of the Hong Kong Government pointed out that "refuse plastic fuel" would give off toxic gas in the burning process and hence its adoption in Hong Kong was not recommended.



Plastic waste converted into "refuse plastic fuel" for energy production

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Visit to the Education Corner of the Gangbuk Waste Recycle Treatment Plant

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Food waste recycling

2.4.7 In the past, food waste was directly landfilled and leachate from food waste was disposed of by way of ocean dumping. Food waste recycling in South Korea started in 1998. In 2005, direct landfilling of food waste was banned. Separate collection of food waste has since been implemented and food waste recycling activities have been intensified. From 1 January 2013, the South Korean Government has also banned the dumping of food waste leachate into the ocean. In South Korea, there are about 264 food waste treatment plants, of which 102 are operated by local governments and 162 by the private sector. The overall capacity of government-run and privately-run treatment plants is 5 584 tons/day and 7 054 tons/day respectively.

2.4.8 Most of the food waste collected is recycled, and the overall food waste recycling rate is on the high side at above 90%. The food waste is recycled into fertilizer, animal feed and energy. Only a small percentage is incinerated or landfilled. The different ways for treating food waste in South Korea in 2009 were as follows –

Ways of treatment	Percentage
1. Recycling	94.7%
<i>Fertilizer</i>	46.9%
<i>Animal feed</i>	38.4%
<i>Energy</i>	9.4%
2. Incineration	3.3%
3. Landfill	2.0%
Total	100%

2.4.9 The delegation visited one of the food waste recycling centres in Seoul, the Songpa Recycling Centre, to understand its recycling operation.

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Visit to the Songpa Recycling Centre

2.4.10 Established in 2010, the Songpa Recycling Centre is a privately-run plant. The Recycling Centre can process up to 450 tons of food waste each day using the anaerobic digestion technology. It is situated in the vicinity of residential area. Notwithstanding this, food waste odour is under control. The delegation generally did not feel the presence of unpleasant smell when touring the Recycling Centre, although there was some odour at the food waste processing area.



Greeting by the representative of the Songpa Recycling Centre

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The delegation was briefed on the operation of the Songpa Recycling Centre and food waste recycling

2.4.11 The delegation received a briefing on the operation of the Recycling Centre. According to the staff of the Recycling Centre, food waste is collected at designated residential and commercial spots every day. To minimize the nuisance to nearby residents, collected food waste is unloaded in the underground area of the Recycling Centre. After necessary processing and treatment in the recycling facility, food waste is turned into different resources, including animal feed, bones, biodiesel and metal items, for further use.

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Recycling of food waste into different resources using anaerobic digestion technology. The resultant materials are: (from left) animal feed, bones, steel utensils, biodiesel, recycled residuals, and wooden chips

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Photo taken in front of the food waste treatment facility

Recycling of construction waste

2.4.12 In South Korea, about 95% of construction waste is recycled. Construction waste is mainly recycled for simple use, and only 24% is turned into high value-added products such as concrete aggregates.

2.4.13 Under the *Construction Waste Recycling Promotion Act*, public corporations generating more than 100 tons of construction waste are obliged to use a certain level of recycled aggregates for subbase of roads, industrial complexes, and environmental infrastructures. Currently, about 20% of the projects are subject to this obligation. It is expected that by 2016, such recycling obligation would be expanded to 40% of construction projects.

2.4.14 During the stay in Seoul, the delegation took an opportunity to visit a large scale construction site in Dongdaemun to understand more about construction waste recycling in South Korea.

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Visit to a works project on construction waste recycling in Dongdaemun

2.4.15 The project under construction is called Dongdaemun Design Plaza and Park, covering a land area of some 60 000 square meters. Constructed by Samsung C&T, the project uses recycled construction waste and eco-friendly materials in its construction and design. The project, involving the construction of several exhibition and convention halls and a vast park, is expected to be completed in July 2013.

2.4.16 The delegation conducted a tour of the construction site and was briefed on South Korea's construction waste recycling policies and Samsung C&T's construction waste management system. According to the staff of Samsung C&T, the waste management strategy adopted in this project aimed to promote reduction and recycling throughout the whole life-cycle from the phases of planning/design/procurement, construction to maintenance/demolition, as follows –

- (a) planning/design/procurement phase :
 - standardizing the materials based on the programming application (known as the Building Information Management) so as to minimize waste; and
 - implementing preferential purchase of low waste and recycled materials;
- (b) construction phase :
 - using waste and reusable materials as the main resources. Members of the delegation were told that the carpets used in the site were made of waste. They also noted that the composite boards could be reused for dozens of times;
 - refraining from the use of disposable materials; and
 - imposing penalty on subcontractors not participating in waste reduction; and
- (c) maintenance/demolition phase :
 - selecting a more effective dismantling method to enhance waste recycling.

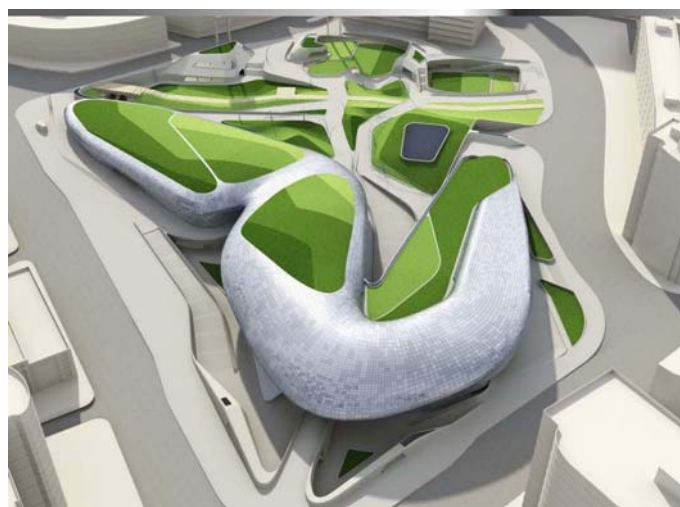
Chapter 2 — Waste management policies and related treatment infrastructures



Delegation members were briefed on the use of recycled construction waste and recyclable materials



Carpet made of waste



Graphic design of the Dongdaemun Design Plaza and Park

Chapter 2 — Waste management policies and related treatment infrastructures



Group photo taken outside the construction site after the visit

Extended Producer Responsibility System

2.4.17 The EPR System was introduced in 2003 to replace the former Waste Deposit System⁴. Under the EPR System, producers are imposed the collection and recycling responsibilities for the products they make or import. Every year, producers have to meet the required recycling quota set by the Ministry of Environment. The products which are subject to mandatory recycling include packaging materials, electronic products, batteries, lubricants, etc. The list of regulated items and their mandatory recycling rates in 2010 are shown in the table below –

⁴ The former Waste Deposit System required manufacturers to pay a deposit to the Government for the production of recyclable items, including bottles, aluminium and steel cans, glass, and polyethylene bottles. The deposit was refundable to the manufacturers upon proper collection and treatment of the items by them. It was however proved ineffective as most producers simply passed on the cost of the deposit to consumers through product prices rather than making efforts to collect used recyclable items and recoup the deposit.

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Item		Mandatory recycling rate in 2010 (%)	
(a) Metal cans	Steel cans	75.6	
	Aluminum cans	75.6	
(b) Glass bottles		75.1	
(c) Paper packaging		32.7	
(d) Plastic packaging materials	PET bottles	Sole material	76.4
		Composite material	76.4
	Styrofoam		76.0
	Polystyrene paper		36.7
	PVC		60.0
	Sole material		70.2
Composite material		51.7	
(e) Lubricants		69.2	
(f) Tires		75.4	
(g) Fluorescent light bulbs		26.1	
(h) Batteries	Mercury batteries		60.0
	Silver oxide cells		42.4
	Lithium batteries		57.7
	Nickel-cadmium battery		33.3
	Manganese dry cells/alkali manganese dry cells		23.6
	Nickel-metal hydride batteries		28.9
(i) Electronics products	Televisions		19.0
	Refrigerators		22.1
	Washing machines		27.4
	Air conditioners		2.4
	Personal computers		12.3
	Stereos		17.0
	Mobile phones		22.0
	Printers		13.0
	Copiers		14.2
	Fax machines		13.4

Note: For items (a) to (d), mandatory recycling applies to those used for packaging food and drinks, raw commodities, detergents, cosmetics, shampoos & conditioners for pet, medical supplies, butane gas, insecticides, electric and electronic equipment buffer.

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2.4.18 Producers can fulfill their recycling obligations through –

- (a) direct recovery and recycling;
- (b) contracting out to a recycling business directly; or
- (c) engaging Producers Responsible Organizations, which are organizations authorized by the Ministry of Environment to perform recycling obligations, by paying joining fees.

2.4.19 Producers who fail to meet their obligations are subject to standard recycling fees and surcharge. The delegation was advised by the Ministry of Environment that the majority of producers (92.8%) had fulfilled their obligation by engaging Producers Responsible Organizations. Contracting out to recycling businesses and recycling by the producers themselves accounted for only 7.1% and 0.1% respectively.

2.4.20 While the major obligation of recycling rests with producers, the responsibilities are also shared by all players involved in the life-cycle of the products. The below table summarizes their respective roles and responsibilities under the EPR System –

Players	Role and responsibilities
Producers	<ul style="list-style-type: none"> • Performing the required recycling obligations
Consumers	<ul style="list-style-type: none"> • Separately discharging recyclable wastes
Local government	<ul style="list-style-type: none"> • Carrying out public awareness programmes for local residents • Disposing of non-recyclable wastes and collecting recyclable wastes for recycling
National government	<ul style="list-style-type: none"> • Enacting and amending waste management laws • Administering the system • Setting mandatory recycling rates • Authorizing the establishment of Producers' Responsible Organizations
Korea Environment and Resources Corporation ⁽¹⁾	<ul style="list-style-type: none"> • Setting overall direction regarding the EPR operation

Note: (1) The Corporation is a subsidiary organization of the Ministry of Environment entrusted with the responsibility of establishing resource-recycling policies, including the EPR System.

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Growth of the recycling industry

2.4.21 The delegation notes that the introduction of the volume based waste fee system and the EPR System have a significant bearing on the growth of the resource recycling businesses in South Korea. In 2009, there were over 4 000 recycling companies throughout the nation, increasing from about 1 650 in 1999. The South Korean Government's financial support has also largely contributed to the industry growth. For instance, small recycling businesses are provided with long-term low interest loans for the development of recycling facilities and technologies. For new recycling businesses, they are given consultations from business initiation experts to facilitate their start-up work.

2.5 Recovery of energy from waste

2.5.1 As part of its efforts to promote resource re-circulation and green growth, the South Korean Government has been actively expanding the waste-to-energy facilities in recent years to increase the conversion of combustible and organic waste for energy utilization.

2.5.2 In Seoul, there are four resource recovery facilities located in the districts of Mapo, Nowon, Gangnam and Yangcheon respectively. These resource recovery facilities, which are essentially incinerators, are capable of recovering heat in the process of trash burning. The heat recovered is provided to nearby households in the form of hot water. According to the Seoul Metropolitan Government and SMC, the four resource recovery facilities in Seoul have the following characteristics –

	Yangcheon	Nowon	Gangnam	Mapo
Construction period	1992-1996	1992-1997	1994-2001	2001-2005
Area (square meters)	14 627	46 307	63 813	58 435
Capacity (tons/day)	400	800	900	750
Waste incineration (tons/day)	345	614	835	635
Coverage	3 districts	6 districts	7 districts	5 districts
Operational ratio	86%	77%	93%	85%

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2.5.3 In addition to generating energy through incineration, the South Korean Government is also committed to building a cleaner environment by turning landfill gas into power.

2.5.4 To obtain a better understanding of the waste-to-energy initiatives of South Korea, the delegation visited the resource recovery facility in Mapo and the country's largest sanitary landfill, the Sudokwon Landfill.

Visit to the Mapo Resource Recovery Plant (An incinerator)

2.5.5 The Mapo Resource Recovery Plant is an incineration facility established in 2005 with a waste processing capacity of 750 tons/day. The plant collects and treats waste from five districts, namely Jongno-gu, Jung-gu, Yongsan-gu, Seodaemun-gu and Mapo-gu. Currently, it is operating at about 85% of the designed capacity.



Mapo Resource Recovery Plant

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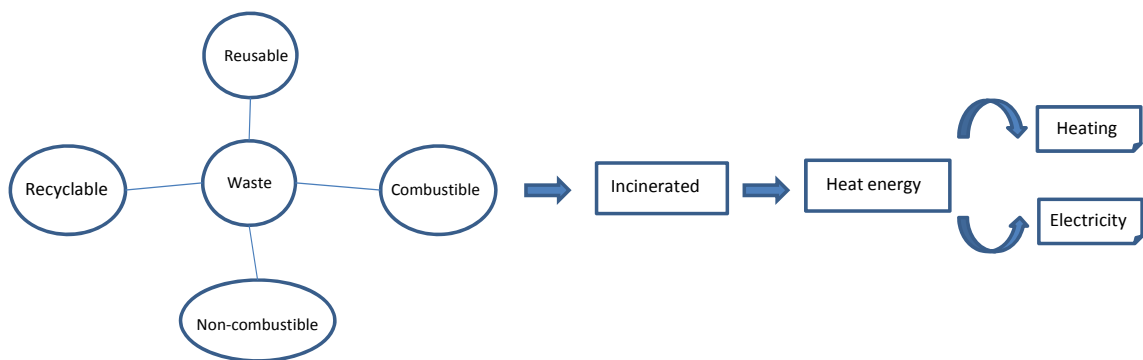
Emission of filtered gas from the stacks at the Mapo Resource Recovery Plant

2.5.6 The delegation was given a briefing on the initiatives relating to incineration and other waste management issues by representatives of the Seoul Metropolitan Government. Members note that combustible waste is incinerated at 930 degree Celsius. Through incineration, the Plant produces about 520 000 Gcal of energy every year. Of this, 200 000 Gcal is self-consumed while 320 000 Gcal is sold. The energy produced is transformed into heat, part of which is made available for use by nearby residents. Residents living within 300 meters of the Plant are subsidized for their electricity tariff as a means to compensate for their dissatisfaction and discomfort. The delegation was told that, compared with other incineration facilities, the Plant had adopted a more advanced technology capable of treating exhaust gases discharged from the incinerator more thoroughly.

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2.5.7 The Plant is also designed to be more modern in appearance. For instance, landscaping has been improved to better harmonize with the surrounding Haneul Park, Noeul Park and Han River, and the boundary fences have been removed so that residents are able to view the clean operation of this environmentally-friendly facility. This open-access design has helped get rid of the previous negative image of incineration facilities.

2.5.8 The figure below illustrates the heat production process from combustible waste through incineration –



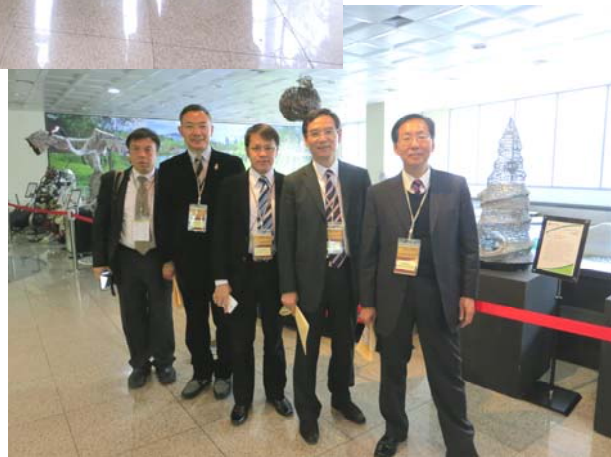
Chapter 2 — Waste management policies and related treatment infrastructures

2.5.9 Following the briefing, the delegation toured the incineration facility. In particular, it visited the Crane Control Room to observe the waste treatment process and the Eco Plaza where an exhibition of junk art made of different types of waste was staged.

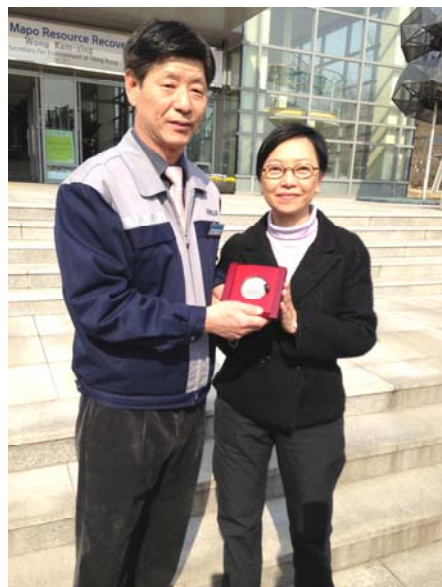


The delegation visited the Crane Control Room to observe the waste treatment process

Chapter 2 — Waste management policies and related treatment infrastructures



Exhibition of junk art



The delegation leader presented a souvenir to the representative of the Mapo Resource Recovery Plant

Chapter 2 — Waste management policies and related treatment infrastructures



Group photo taken outside the Mapo Resource Recovery Plant after the visit

Visit to the Sudokwon Landfill

2.5.10 The Sudokwon Landfill, located in Incheon, is the largest sanitary landfill in South Korea covering 2 000 hectares of land. It has an average daily intake of 18 000 tons of household, construction and industrial wastes generated in the metropolitan areas of Seoul, Incheon and Gyeonggi provinces, serving a population of 24 million.

2.5.11 The Landfill comprises four landfill sites. The first one, which is 30 to 40 meters in height with eight layers of landfill, has been saturated in 2000. The second one is currently in operation and will saturate by 2015. The remaining two landfill sites are set for future use. The delegation notes that there is currently conflict between the Seoul Metropolitan Government and the Incheon City Government over the extension of the life of the Landfill. As a whole, the capacity of the Landfill is anticipated to last until 2044. However, the Incheon City Government, which has the authority to grant permission for landfill operation, does not agree to extend the operation of the Landfill

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through 2044. It wants the Landfill to stop taking waste in three years. The delegation notes that negotiations between the parties concerned are still ongoing with a view to resolving the problem.

2.5.12 The delegation conducted a tour of the Landfill and was briefed on the various facilities and development initiatives. According to the staff of the Landfill, the landfill gas generated during the waste burial process is collected and used for electricity generation. The Landfill is operating the world's largest 50MW power plant utilizing landfill gas. It generates electric power worth USD 30 million annually and obtains a certified emission reduction equal to 850 000 CO₂ tons.

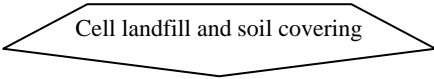


The delegation observed the design model of the Sudokwon Landfill

Chapter 2 — Waste management policies and related treatment infrastructures

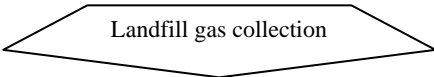
2.5.13 The Landfill is equipped with various facilities, including the landfill gas collection facilities, rainwater drainage system, and the facilities for deodorization, disinfection and dust reduction. The delegation was briefed on the operation of the Landfill, as well as its systems and processes, as follows –

Chapter 2 — Waste management policies and related treatment infrastructures



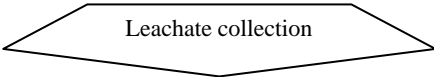
Cell landfill and soil covering

Unloaded waste is compressed into "cells" measuring 4.5 meters in height and covered with 0.5 meter of soil. After daily landfill work is finished, waste is covered with 0.2 meter of soil within five hours to prevent from waste fluttering, insects, rainwater seepage, and odours.



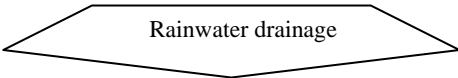
Landfill gas collection

Organic matter in waste materials is biodegraded and turned into gas. The gas is collected and transported to the 50MW power plant to generate electricity and prevent odours.



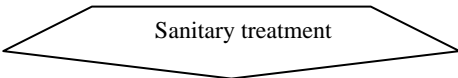
Leachate collection

The bottom layer of the landfill site is 0.75 meter thick impermeable layer which prevents ground water and contamination from leachate. Collected leachate is channeled to a leachate treatment centre via a leachate collection pipeline.



Rainwater drainage

Rainwater in the non-working area is drained promptly through a rainwater drainage facility to minimize the amount of leachate.



Sanitary treatment

During waste landfill work, pesticide and deodorants are sprayed in the work area. The area surrounding the work site is also sprayed with pesticide, and aerial deodorants combined with sprinkled road wash.



Minimization of odours

Related facilities are in place to minimize odours generated by the waste burial process and separating process.

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2.5.14 The delegation notes that a clean energy town, namely Metropolitan Eco & Energy Town, is being built on the landfill. The Town, to be equipped with waste-to-energy facilities, will comprise four energy-themed communities (i.e. the Waste-to-Energy Town, Natural Energy Town, Bio Energy Town and Eco-Culture Complex) designed to be running on a self-sufficient basis with a target energy production of 2.61 million Gcal every year.

2.5.15 The delegation also notes that the closed landfill site is now under transformation into an environmental theme park known as DREAMPARK, for the promotion of education, sports, and leisure activities. DREAMPARK is also expected to raise public awareness of the importance of preserving the natural environment. The delegation was told that after full implementation of the related infrastructures and facilities, the Sudokwon Landfill would be turned into an international environmental tourism spot.



The delegation leader exchanged souvenirs with the Chief Executive Officer of the Sudokwon Landfill

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The landfill gas vents at the Sudokwon Landfill were disguised as trees ; trucks were spraying pesticide onto the Landfill



Group photo taken after the visit to the Sudokwon Landfill

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2.6 Ecological restoration

2.6.1 On its last day of the visit in Seoul, the delegation visited Cheong Gye Cheon (also known as "Cheonggye Stream"), which was successfully restored into a modern public recreation space in downtown Seoul in 2005.

2.6.2 Cheong Gye Cheon was originally a stream running through the centre of Seoul from west to east. In the 1950s, the stream was seriously polluted with bad smell due to the lack of water flow. At that time, the South Korean Government dealt with the problem by covering it with concrete. In later years, an elevated highway of several kilometers was built there to support the rapid urbanization. However, during 1980s and 1990s, the noise and air pollution there became the obstacle for further urban development.

2.6.3 The delegation received a briefing on the restoration project and learned that the restoration of Cheong Gye Cheon was advocated by the former president of South Korea, Lee Myung-bak, in his Seoul Mayor election manifesto. The restoration project involved the removal of the elevated highway, restoration of the stream, and creation of green areas and recreation space. As the project affected 200 000 merchants and 60 000 shops along the stream, it encountered much political resistance. To collect opinions of merchants on the impact of the restoration project, the Seoul City held public hearings and presentation sessions for each commercial block. More than 4 000 interviews had been conducted with the affected merchants before the start of the demolition work in 2003.

2.6.4 The delegation was advised that based on the opinions collected, the following measures had been adopted to address the inconvenience caused to businesses by the restoration project and to stimulate the business activities of the Cheong Gye Cheon commercial district –

- (a) employing the most advanced engineering technology to minimize the nuisances such as noise and dust arising from the demolition work;
- (b) creating a parking lot, which charged low parking fees, in Dongdaemun Stadium to resolve the parking space

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- shortage and the provision of free shuttle bus service to Cheong Gye Cheon;
- (c) providing financial support and subsidies, e.g. making available low-interest loans to the affected merchants and small business operators who suffered poor sales during the restoration;
 - (d) promoting Cheong Gye Cheon stores by the Government through advertising on electronic billboards on streets, newspapers, hanging banners and leaflets; and
 - (e) giving priority to Cheong Gye Cheon stores when procuring supplies for the Seoul Metropolitan Government and local district government.

2.6.5 Owing to the restoration project, street vendors were no longer able to do business in the area. As such, the Government encouraged them to move. As a result of continued dialogue, most of the street vendors moved to Dongdaemun Stadium and a new and unique market was created.

2.6.6 After the briefing, the delegation toured the Cheong Gye Cheon Museum to learn more about its past and present look. The delegation notes that the restored Cheong Gye Cheon is normally dry and so requires additional water flow from a water plant to maintain a certain depth of water throughout the year. This necessitates continual consumption of electricity and hence has led to the criticisms of some green groups. Since there is less traffic and more constant water flow after restoration, the temperature around Cheong Gye Cheon is generally 1.5-2.0 degree Celsius lower than the average. The restored site has become a popular recreational sport for the citizens of Seoul.

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Briefing by representative of the Cheong Gye Cheon Museum



The delegation observed a model of the Cheonggyecheon restoration project

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The delegation observed the satellite pictures of downtown Seoul, including the Cheonggyecheon neighbourhood

Chapter 3 — Meetings with government bodies and green groups

3.1 Meetings with government bodies

3.1.1 During its stay in Seoul, the delegation met with officials of the Ministry of Environment and members of SMC to learn about their experience in formulating and implementing the various waste management policies in South Korea.

Ministry of Environment

3.1.2 The Ministry of Environment is the government agency in charge of the overall environmental policies in South Korea. As mentioned in paragraph 2.1.4, it is responsible for, among others, setting out plans and frameworks for waste reduction, waste recycling, and resource recirculation. The delegation paid a visit to its central government office in the Sejong City and received a briefing on the country's overall waste management system and initiatives.



Briefing by representative of the Ministry of Environment

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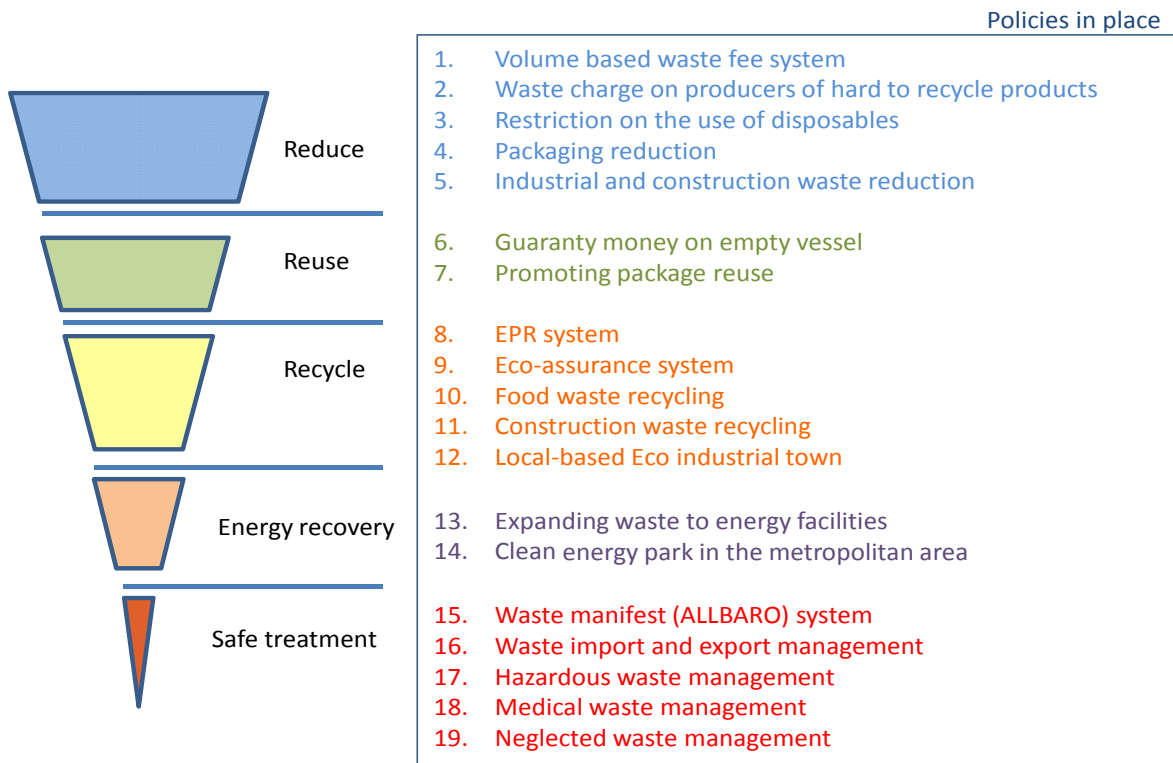


Briefing by representative of the Ministry of Environment

3.1.3 The delegation notes that waste management in South Korea is characterized by the mixed implementation of: (a) economic instruments, (b) regulatory instruments, (c) cooperation instruments, and (d) education and information instruments. The volume based waste fee system and the EPR System, requiring polluters to bear the cost of pollution, are two successful examples of economic instruments for waste management in South Korea. These policy tools, aiming to expand public participation in waste management, are contrary to and operated in tandem with the regulatory instruments that are concerned with the imposition of restrictions or control, for instance, on the use of disposable products and certain packaging materials. The following diagrams illustrate the policy instruments and policy measures for waste management in South Korea –

Policy instruments			
Economic	Regulatory	Cooperation	Education & Information
• Discharge fee	• Hazardous waste	• Public-private partnership	• Training & education
• Production charge	• Disposable products restriction	• Voluntary agreement	• Awareness raising
• Green public procurement	• Packaging reduction		• Eco-labelling
• Subsidy			

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3.1.4 Cooperation is another key approach to waste management in South Korea. On this front, the Ministry of Environment shared with the delegation its pioneering projects to establish recycling complexes which bring together a variety of recycling enterprises for waste treatment to achieve higher efficiency through cooperation. The delegation was also informed that there was an eco-labelling system in South Korea to encourage public consumption of environmentally-friendly products and that some graduate schools were specialized in clean energy research. These formed part of the education and information-based instruments promoting sustainable waste management in South Korea.

3.1.5 Officials of the Ministry of Environment advised that the availability of government support and subsidies was essential to the success of policy implementation. For instance, they provided pre-paid garbage bags to the poor free of charge under the volume based waste fee system and offered low interest loans to support recycling businesses. In addition, the presence of non-governmental green organizations in the community was considered very helpful. These organizations collected opinions from citizens and provided constructive inputs in the

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formulation of waste management policies, giving invaluable contributions to the success of South Korea's waste management.

3.1.6 South Korea's achievements in waste management are remarkable. The delegation was told that on the whole, there was 46% reduction in municipal waste generation daily from 1.77 kg/day per capita in 1981 to 0.95 kg/day in 2011. The overall recycling rate (which had taken into account different kinds of waste including construction waste that had a recycling rate of over 90%) registered 83% in 2011, the world's leading rate. In terms of landfilling, 50 kilotons of waste were treated per day in 2000. In 2011, the amount so treated fell to 35.9 kilotons per day. The South Korean Government has indicated that in the future, it would continue to keep less use of landfill while maximizing the recovery of energy from waste in the landfilling process.



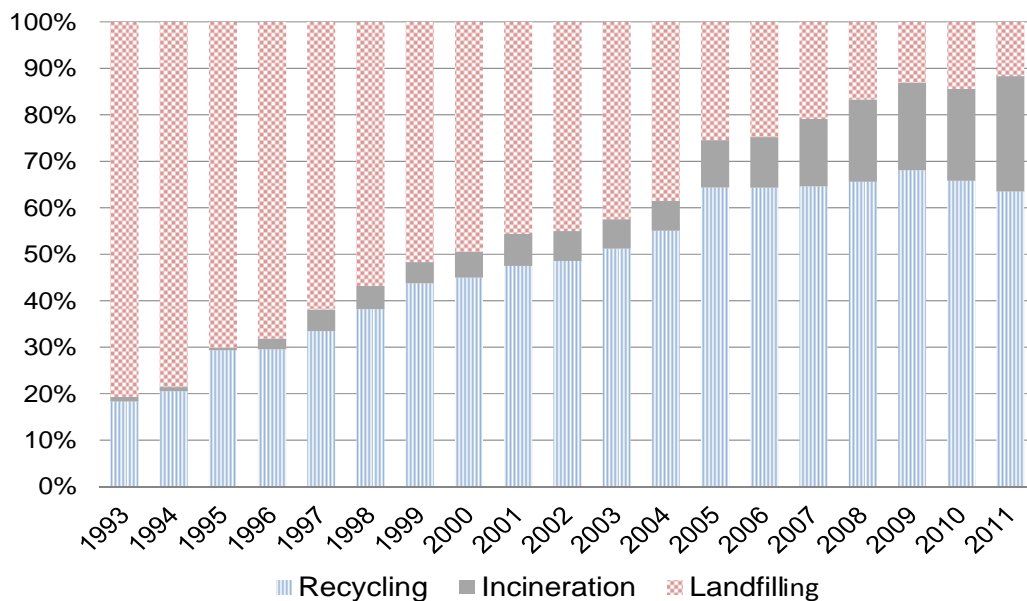
The delegation leader exchanged souvenirs with Mr JEONG Yeon-man,
Vice Minister of the Ministry of Environment

Chapter 3 — Meetings with government bodies and green groups

Seoul Metropolitan Council

3.1.7 SMC is a legislative body with the power to enact, revise and abolish municipal ordinances. One of its standing committees, namely the Environment and Water Resources Committee ("EWRC"), is in charge of environment related affairs. The delegation met with the committee members to discuss various aspects of waste management. In particular, the experience in relation to the implementation of waste treatment infrastructures in Seoul was shared.

3.1.8 The delegation was advised that landfilling was the most common way of waste disposal in South Korea in the past. However, because of the shortage of new land in urban areas and the growing concern of its potential environmental hazards, landfilling had now become the last resort for waste disposal. The delegation was also informed that since the introduction of the volume based waste fee system in 1995, the share of recycling had grown considerably and it had now become the primary means of waste treatment. Construction of resource recovery facilities in recent years had also resulted in a greater use of incineration. The figure below shows the desirable shift in the waste treatment methods in Seoul in the past 20 years —



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3.1.9 When asked about the experience in the construction of energy recovery infrastructures, members of EWRC told the delegation that there had been strong resistance and opposition from residents against construction of such facilities in their adjacent area. Under the policy of joint use of one single facility, there were not only conflicts among local residents but also conflicts among regions. As such, there had been continued dialogue and discussion with different parties before a consensus could be reached. To overcome public resistance, the Government had invited opinion leaders to visit the most advanced incineration facilities overseas and credible experts were also invited to talk to local residents about the safety of the resource recovery facilities. The Government and SMC had conducted thorough consultation and maintained communication with nearby residents throughout the pre-implementation phase.



The delegation exchanged views with members of the Environment and Water Resources Committee, Seoul Metropolitan Council

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The delegation exchanged views with members of the Environment and Water Resources Committee, Seoul Metropolitan Council

3.1.10 Members of EWRC further revealed that to compensate for nearby residents' discomfort and discontent, the local government had been providing the residents living within 300 meters of the facilities with subsidies and incentives, including the payment of apartment management fee and heating cost for them. It had also established a residents assistance fund which was funded by part of the profits of the resource recovery facility. The fund was used for improving the living environment, such as developing leisure facilities, in the region.

3.1.11 As regards food waste, members of EWRC indicated that private food waste treatment facilities used to treat over 60% of the food waste in Seoul. However, it was increasingly difficult for the private sector to take part since the running cost was rising rapidly and residents strongly resisted the development of such facilities in their living area. The local governments had therefore taken up the responsibility for building the facilities in their regions. With local government's greater involvement, it was expected that the share of food waste treatment by

Chapter 3 — Meetings with government bodies and green groups

private facilities would decline to about 30% by 2016 and further to 5% by 2018 as follows –

Year	2013	2016	2018
Generation (tons/day)	3 012	2 343	2 009
Treatment			
<i>Public facilities</i>	45%	69%	95%
<i>Private facilities</i>	55%	31%	5%
Total	100%	100%	100%

Source: Seoul Metropolitan Government



Photo taken with members of the Environment and Water Resources Committee,
Seoul Metropolitan Council

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3.2 Meetings with non-governmental green organizations

3.2.1 The delegation had the opportunity to meet with a national non-governmental organization active in waste management issues, namely Korea Zero Waste Movement Network ("KZW MN"), and an international organization on environmental protection, Greenpeace.

Korea Zero Waste Movement Network

3.2.2 KZW MN is a non-governmental organization established in 1997 to address waste problems caused by rapid urbanization in South Korea. It is a national network made up of over 180 non-governmental organizations that are mainly women organizations focusing on waste management matters. KZW MN gets together the civil organizations regularly to discuss waste management issues, and makes proposals to the South Korean Government on waste management initiatives.

3.2.3 The roles of KZW MN are to –

- (a) research and provide advice to the South Korean Government on waste management issues;
- (b) monitor the waste management practices of businesses;
- (c) play as an intermediary to relay the opinions of civil organizations to the South Korean Government;
- (d) improve the resource-cyclical society by promoting mutual cooperation among the South Korean Government, waste management industry and the public; and
- (e) enhance citizens' awareness on environmental issues by conducting zero waste campaigns.

3.2.4 Ms KIM Mi-hwa, Secretary-General of KZW MN, shared with the delegation the organization's work and her experience in advocating zero waste in the country. The delegation was told that KZW MN began

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its campaigns on no use of disposable products back in late 1990s. At that time, KZWMN proposed to the South Korean Government a charge system for the supply of plastic shopping bags in department stores and supermarkets. The proposal was subsequently adopted as a policy by the South Korean Government in 1999, resulting in a 50% reduction in the use of disposable bags. To further reduce the usage of plastic bags, KZWMN later cooperated with the nation's five largest supermarkets by signing cooperative agreements with them to cease selling or providing plastic bags. The movement has greatly reduced the use of plastic bags by 400 billion annually.

3.2.5 In 2008, under the support of the South Korean Government, KZWMN launched the Green Mileage Campaign with major production companies and distributors to offer simple packaging for certain product items (such as bathing stuff, food, drink and cosmetics). Consumers buying these simple packaged products could enjoy discounts and earn green mileage points for change of free gifts.



Members of the delegation received a briefing from representatives of the Korea Zero Waste Movement Network on the experience and future missions of waste recycling movement in South Korea

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3.2.6 Ms KIM further informed the delegation that the introduction of the EPR System in 2003 was recommended by KZWMN. At the beginning, there was strong resistance from large electronic corporations as they considered that the recycling obligation would not favour them but would raise their running costs. However, they realized later that the extended responsibility under the EPR System had better prepared them for compliance with similar regulations in overseas markets. Further, the policy had prompted them to design and develop recyclable products with environmentally friendly materials using new technology, which benefited their overseas market expansion and the creation of more jobs locally.

3.2.7 Ms KIM opined that it was a challenge to reduce food waste generation in South Korea. KZWMN had launched a lot of promotion and education on food waste reduction over the years but the result was not entirely satisfactory. They therefore demanded and pushed for the introduction of the volume based waste fee system for food waste. KZWMN was pleased to see that the system was gradually being implemented nation-wide in phases and the reduction in food waste generation thus far had been noticeable.

3.2.8 The delegation was also told that whilst the implementation of waste reduction and recycling policies had inevitably created inconvenience to citizens, South Koreans were generally supportive and had a high tendency to comply with government policies. For instance, they were willing to follow the requirement of separating recyclable waste into different types for disposal. Over the years, KZWMN had made a great deal of efforts to educate the public and talk to the business sector on waste management. When asked about the reason why South Korean people were willing to comply with the waste reduction policies despite the inconvenience, Ms KIM said she believed that probably because South Koreans were patriotic and had a strong sense of belonging to the country, civil organizations in South Korea were able to gain public support in advocating sustainable public policies.

3.2.9 Although the recycling rate of some 60% for municipal waste registered in South Korea is one of the world's highest recycling rates, Ms KIM said that KZWMN was not satisfied with the rate and would strive to achieve a target rate of 80% in the near future. In particular, she

Chapter 3 — Meetings with government bodies and green groups

expressed a desire to achieve 100% recycling rate for waste electronic products in the long term.

3.2.10 According to Ms KIM, KZW MN used to receive financial support from the South Korean Government through annual funding of around KRW 600 million (i.e. HK\$4.08 million) every year for the network operation and promotion of waste management related activities. However, after the inauguration of the new Government term in 2008, KZW MN had no longer been given such financial support.



Group photo taken with representatives of the Korea Zero Waste Movement Network

Chapter 3 — Meetings with government bodies and green groups

Greenpeace

3.2.11 Greenpeace, founded in 1971, comprises 28 independent national and regional offices around the world. Its office in Seoul was established in June 2011. Apart from Seoul, it also has offices in other parts of the East Asian region including Hong Kong, Beijing and Taipei.

3.2.12 The overall objectives of Greenpeace are to –

- (a) protect biodiversity;
- (b) prevent pollution and abuse of oceans, land, air and water;
- (c) end nuclear threats; and
- (d) promote peace and global disarmament.

3.2.13 All national and regional offices of Greenpeace follow an agreed-upon global campaign strategy and work independently within their local context. Campaigns carried out in South Korea are mainly concerned with climate, energy and oceans. On its source of funding, the delegation was advised that Greenpeace received contributions only from individual supporters and foundation grants. It did not accept donations from governments, corporations or political parties.

3.2.14 The delegation was told that since the outbreak of the nuclear crisis in Japan due to the earthquake in 2011, Greenpeace had been strongly calling for increased nuclear safety and phasing out of nuclear power generation in South Korea. To continue to raise public concern over nuclear threats, one of the major programmes undertaken by Greenpeace in South Korea was on nuclear opposition and promotion of alternative and cleaner energy sources.

3.2.15 The delegation was also told that Greenpeace was supportive of waste reuse and recycling and the initiative of waste to energy. However, Greenpeace had environmental concerns about the incineration of waste.

Chapter 3 — Meetings with government bodies and green groups



Group photo taken with representatives of Greenpeace East Asia

Chapter 4 — Follow-up event in Hong Kong

4.1 Exhibition

4.1.1 Shortly after the visit to Seoul, the delegation held an exhibition of the photographs taken and the souvenirs and publications received in the Dining Hall of the Legislative Council Complex on 17 and 18 April 2013. Members of the delegation briefed the media and other Legislative Council Members on their experience gained from the visit. The Secretary for the Environment also joined to share his views on the visit.



The photographs, souvenirs and publications displayed

Chapter 4 — Follow-up event in Hong Kong



Media briefing by the delegation



Group photo taken after the media briefing

Chapter 4 — Follow-up event in Hong Kong

4.1.2 To share with members of the public the information collected during the duty visit, the exhibition was moved to the Exhibition Area and the Legislative Council Library of the Legislative Council Complex and opened to the public from 22 April to 7 June 2013.



Exhibition held in the Exhibition Area of the Legislative Council Complex

Chapter 5 — Observations and conclusions

Having received briefings and exchanged views with various government officials and representatives of relevant organizations, and visited a number of waste recycling and waste treatment facilities, the delegation has the following observations.

5.1 Observations

5.1.1 The delegation is highly impressed by the success of the waste management strategies implemented by the South Korean Government in reducing waste, expanding the reuse of goods, maximizing recycling and recovering energy from waste.

5.1.2 The delegation notes that back in the 1990s after South Korea's economy had taken off, the country's wasteload per capita was comparable to that in Hong Kong today. However, following the introduction of various new policy initiatives in 1995, the overall waste disposal rate substantially dropped by 40% in just a few years. The recycling rate has increased to 60%, whereas the economic benefits of the recycling industry have increased from HK\$1.7 billion in 2001 to HK\$7 billion in 2009. The growth of the recycling industry has created more employment opportunities for the people. In September 2013, the South Korean Government has announced that it would further step up efforts to build a resource-circulating society by minimizing landfill use and maximizing recycling. It is expected that the move towards a resource-circulating society would lead to an increase in recycling by 10 million tons annually, growth of the recycling market by KRW 5 trillion (i.e. about HK\$34 billion) and creation of 11 568 jobs, generating huge economic benefits.

Government support

5.1.3 The delegation considers that South Korea's remarkable achievement in reducing waste generation and raising recycling rates is attributable to the strong commitment of its Government to tackling the waste problem. The South Korean Government has not only put in place a package of regulatory instruments that impose control or restrictions, such as the volume based waste fee system and the law that prohibits the use of disposable products and excessive packaging, but has also

Chapter 5 — Observations and conclusions

supported waste management by providing funds and land. In this connection, the delegation notes that the local government of Gangbuk-gu granted land for establishing the Gangbuk Waste Recycle Treatment Plant and provides regular funding for its operation. The delegation is of the view that government-driven initiatives and government support and subsidies are indispensable to the achievement of waste management targets.

Public engagement

5.1.4 The delegation observes that the South Korean Government attaches much importance to public engagement in formulating and implementing various environmental policies and initiatives. We understand that there has been no lack of resistance and objection from local residents against the provision of waste treatment facilities, such as energy recovery infrastructures, in their neighbourhood. To overcome public resistance, the South Korean Government has engaged in thorough consultation and communication with different affected parties and residents before implementation. The Government has also compensated affected residents by offering subsidies and financial incentives, including the payment of apartment management fee and heating cost for them. A residents assistance fund, which is funded by part of the profits of the resource recovery facility, has also been set up for improving the living environment in the region. All these measures have facilitated the smooth implementation of the project.

5.1.5 Another successful example is the restoration of Cheong Gye Cheon. The delegation notes that to address the concerns of the many merchants affected by the restoration project, a large-scale consultation had been conducted prior to the launching of the project and effective measures had subsequently been taken to assist the merchants who suffered poor business as a result.

5.1.6 South Korea's experience has highlighted the importance of public engagement. The delegation urges the Hong Kong Government to make reference to South Korea's experience in implementing waste management policies, in particular the controversial ones such as the extension of landfills and construction of incinerators, and proactively engage the public, local residents and other stakeholders in various stages of the planning and implementation process. It is incumbent upon the

Chapter 5 — Observations and conclusions

Government to thoroughly consult and communicate with the affected parties to fully understand their concerns with a view to devising targeted measures to address those concerns. Drawing reference from the experience of South Korea, the Hong Kong Government should favourably consider providing financial incentives and betterment facilities to compensate the local community in exchange for their support.

Waste charging

5.1.7 The delegation finds that waste charging is an effective policy tool for incentivizing people to reduce waste, as demonstrated by the positive results of the volume based waste fee system in South Korea. The system has changed the habits of people such that they are more ready to bring their own reusable shopping bags and reuse goods. In particular, the delegation notes that the South Korean Government has provided financial subsidies to ensure the smooth implementation of the system. Pre-paid garbage bags are distributed to low income groups for free and low interest loans are offered to support recycling businesses. Besides, extensive publicity and education programmes were launched at the inception stage of the system to educate the public on the use of pre-paid garbage bags and classification of recyclables. As our Government is in the course of identifying a way of waste charging that is suitable for Hong Kong, the delegation considers that South Korea's experience is of high reference value. For instance, appropriate assistance should be offered to needy people to alleviate the burden of waste charging on them.

Public education

5.1.8 The delegation believes that waste charging alone is not enough and it is vital to build a consensus in the community about the need to reduce waste so that the behavioural changes can be sustained. To do so, the South Korean Government has adopted education and information-based instruments to raise public awareness on environmental issues. An eco-labelling system has been put in place to encourage public consumption of environmentally-friendly products and that some graduate schools have specialized in clean energy research. The delegation sees the need for the Hong Kong Government to make greater effort to educate the public and raise their awareness on the imminence of the waste problem and the importance of waste management, particularly

Chapter 5 — Observations and conclusions

the younger generation, so that they will be better equipped to evaluate and be more receptive to the environmental initiatives proposed by the Government. The delegation also recommends that the Government should launch publicity and educational programmes targeting at homeworkers so as to drive home the importance of reducing household waste and separating waste at source before disposal.

Supporting recycling industries

5.1.9 The delegation also notes that the South Korean Government has provided strong support to assist recycling industries. It has established recycling complexes which bring together a variety of recycling enterprises for waste treatment to achieve higher efficiency. The delegation urges the Hong Kong Government to draw on the experience of South Korea and devote more resources to promoting the sustainable development of recycling industries in Hong Kong.

Cooperation with private sector

5.1.10 The delegation further finds that there is close cooperation between the South Korean Government and the private sector in waste management. In Seoul, while the waste separation centres are established by the Government, most of them are commissioned to the private sector for management. Among the 264 food waste treatment plants in the country, 102 are operated by local governments and 162 by the private sector. The Songpa Recycling Centre visited by the delegation is a privately-run plant. The delegation considers that greater public-private partnership in the provision of waste management facilities and other environmental issues is worthy of exploration by the Hong Kong Government.

Active participation of civil society

5.1.11 The delegation is particularly impressed by the active participation of the civil society in the formulation and implementation of waste management policies in South Korea. KZWMN, a non-governmental green group, has contributed to the introduction of the EPR System in 2003 and it has also made a lot of efforts to educate the public and the business sector on environmental issues, paving the way for the smooth implementation of environmental initiatives. As acknowledged

Chapter 5 — Observations and conclusions

by the officials of the Ministry of Environment, these green groups have helped to collect opinions from citizens and provide constructive inputs in policy formulation, contributing to the success of South Korea's waste management.

5.1.12 In addition, the delegation observes that the non-governmental green groups and social enterprises are able to gain the wide support of members of public and voluntary workers. It is impressive that the Beautiful Store is entirely funded by public donation, its shops are mainly manned by voluntary workers, 80% of its shops are rent-free and it receives a lot of donated products for sale. The delegation calls on the property developers in Hong Kong to follow the example of South Korea and provide rent-free shops to the non-governmental organizations for setting up environmental businesses.

5.1.13 The delegation considers that the work of non-governmental green groups and social enterprises like the Beautiful Store has helped to educate and raise the awareness of South Koreans on environmental issues and has better prepared them for various waste management measures introduced by the Government. The delegation urges the Hong Kong Government to work closely with the non-government sector and social enterprises and proactively enhance their participation in the formulation and implementation of environmental policies. The Government should also provide greater support to these organizations in order that they can be viable, and explore ways to enable them to play a more active role in the development of a green economy. For instance, the delegation recommends that the Government should allocate space in government premises and facilities, such as public markets, public car parks and public housing developments, to green groups and social enterprises for operating second hand shops.

Chapter 5 — Observations and conclusions

5.2 Conclusions

5.2.1 The delegation considers the visit very useful and enlightening. It has deepened our understanding of the various waste reduction, waste recycling and waste treatment policies and initiatives introduced by the South Korean Government and the key to its success in achieving the country's waste management targets. The briefings by and exchanges of views with members of EWRC of SMC, government officials, representatives of private and public corporations and non-governmental organizations have provided the delegation with first-hand information on how the South Korean Government has met the challenges and tackled the problems in reducing waste, expanding goods reuse, maximizing recycling and recovering energy from waste.

5.2.2 The delegation appreciates that not all the policies and measures adopted by the South Korean Government in managing its waste problem are readily transferable to Hong Kong because of our different cultures and city characteristics. However, South Korea's experience is certainly valuable and can serve as useful reference for Hong Kong as we map out the waste management strategies that are most suitable for us.

Acknowledgements

The delegation wishes to thank all the distinguished individuals, including members of the Environment and Water Resources Committee of the Seoul Metropolitan Council, officials of government agencies and public organizations as well as representatives of private enterprises and non-governmental organizations with whom we met during the visit. The delegation is most grateful to them for their detailed briefings and the useful exchanges of views and information with us.

The delegation would also like to thank the Secretary for the Environment and other members of the delegation of the Hong Kong Government for sharing with us information on waste management in Hong Kong and South Korea to facilitate our study of various issues during the visit. In the course of the visit, members of the delegation and public officers had the opportunity to exchange views on waste management issues and the common experience acquired by both parties has facilitated our follow-up discussions in Hong Kong.

The delegation is grateful to the Hong Kong Economic and Trade Office in Tokyo for their assistance in putting together the visit programme and making the logistical arrangements. Last but not least, the delegation expresses sincere gratitude to staff of the Legislative Council Secretariat for their unfailing support and hard work.

Acronyms and abbreviations

Cheonggye Stream	Cheong Gye Cheon
EPR	Extended Producer Responsibility
EWRC	Environment and Water Resources Committee
GDC	Geumcheon District Council
KZWMN	Korea Zero Waste Movement Network
RFID	Radio frequency identification
SMC	Seoul Metropolitan Council
the Panel	Panel on Environmental Affairs

Visit Programme

1 April 2013 (Monday)	Arrive at Seoul, South Korea
2 April 2013 (Tuesday)	Meeting with the Environment and Water Resources Committee, Seoul Metropolitan Council
	Meeting with Korea Zero Waste Movement Network
	Meeting with Greenpeace East Asia
3 April 2013 (Wednesday)	Visit to Songpa Recycling Centre
	Visit to Mapo Resource Recovery Plant (An incinerator)
	Waste management policy briefing by the Seoul Metropolitan Government
	Visit to Geumcheon-gu to observe the operation of the volume based waste fee system and food waste recycling
4 April 2013 (Thursday)	Visit to Gangbuk Waste Recycle Treatment Plant
	Visit to Beautiful Store
	Meeting with representatives of the Ministry of Environment, South Korea
5 April 2013 (Friday)	Visit to Cheonggye Stream
	Visit to a works project (Dongdaemun Design Plaza and Park) on recycling of construction waste
	Visit to Sudokwon Landfill
	Depart for Hong Kong

Appendix II

List of organizations and persons met by the delegation

2 April 2013 (Tuesday)
Environment and Water Resources Committee, Seoul Metropolitan Council Mr KIM Yong-seong, Chairperson, Environment and Water Resources Committee Other members of the Environment and Water Resources Committee
Korea Zero Waste Movement Network Ms KIM Mi-hwa, Secretary-General Ms Choony KIM, Chief of International Affairs
Greenpeace Asia Mr Lagi TORIBAU, Program Manager Ms SUH Hyung-lim, Climate and Energy Campaigner Ms Jude LEE, Climate and Energy Campaigner
3 April 2013 (Wednesday)
Songpa Recycling Centre Mr HAM Young-gi, Director, Economic & Environment Bureau
Mapo Resource Recovery Plant Dr KIM Dong-sik, Director of Plant
Seoul Metropolitan Government Mr PARK Jong-soo, Director, Resource Recirculation Management Division Mr KIM Yong-buk, Director-General, Climate Change Bureau
Geumcheon-gu Mr CHA Sung-soo, Mayor of Geumcheon-gu Mr KANG Tae-seob, Vice Chairman, Geumcheon District Council Other members of the Geumcheon District Council

Appendix II (cont'd)

4 April 2013 (Thursday)
Gangbuk Waste Recycle Treatment Plant Mr KIM Man-sik, Director of Plant
Beautiful Store Mr LEE Ki-dae, Executive Director Mr PARK Byung-hyeok, Director, Planning Department
Ministry of Environment Mr JEONG Yeon-man, Vice Minister Mr YOO Je-chul, Director, Resource Recirculation Bureau
5 April 2013 (Friday)
Cheong Gye Cheon Museum Mr HAN Eun-hee, Director
Samsung C & T Corporation Mr JEONG Mi-hong, Deputy General Manager, Safety & Environmental Team (EM Part) Mr SHIM Jong-woo, Manager, Safety & Environmental Team (EM Part)
Sudokwon Landfill Mr CHO Chun-koo, Chief Executive Officer

List of the Hong Kong Government delegation

1. Mr WONG Kam-sing	Secretary for the Environment (Head of the Hong Kong Government Delegation)
2. Mr Albert LAM	Deputy Director of Environmental Protection(2)
3. Ms Sally WONG	Principal Representative, Hong Kong Economic and Trade Office (Tokyo)
4. Dr Ellen CHAN	Assistant Director (Environmental Infrastructure), Environmental Protection Department
5. Mr SIN Kwok-hau	Assistant Director (Grade Management and Development), Food and Environmental Hygiene Department
6. Miss Katharine CHOI	Administrative Assistant to Secretary for the Environment
7. Ms Michelle AU	Political Assistant to Secretary for the Environment
8. Ms Connie WONG	Press Secretary to Secretary for the Environment
9. Dr Alain LAM	Principal Environmental Protection Officer (Waste Management Policy), Environmental Protection Department
10. Mr WP YU	Senior Environmental Protection Officer (Infrastructure Planning)2, Environmental Protection Department
11. Mr Alvis TSUI	Deputy Representative, Hong Kong Economic and Trade Office (Tokyo)
12. Mr LEE Hee-kyung	Representative Consultant, Hong Kong Economic and Trade Office (Tokyo)
13. Ms Borah YOO	Consultant, Hong Kong Economic and Trade Office (Tokyo)