Overview

Like many other cities, Hong Kong saw its waste levels grow along with its economy. Hong Kong’s municipal solid waste (MSW) load increased steadily since the mid-1980s, mirroring the city’s rapid economic expansion and population growth.\(^1\) Over the past decade, Hong Kong’s MSW load began to outpace population growth, meaning that per capita MSW disposal went up. This increase has become more marked since 2011, making it a serious issue. According to the Environmental Protection Department (EPD), Hong Kong’s per capita MSW disposal rate (in kg/person/day) rose from 1.27 in 2011 to 1.41 in 2016. Hong Kong’s dependence on landfills for MSW started long before its economic boom. However, the three strategic landfills in Hong Kong were expected to reach capacity in 2019.\(^2\) Therefore, the government therefore needed to come up with solutions and long term goals to resolve a worsening ‘garbage crisis’ and to make sure that Hong Kong’s MSW management practices were sustainable.

Many suggested that the government needed to properly define the problem and identify underlying root causes before coming up with solutions. Hong Kong’s growing population was an important reason for the emerging ‘garbage crisis’, but there were other structural causes as well. With limited MSW treatment options, 63 per cent of Hong Kong’s MSW was disposed at three strategic landfills, with the rest being recycled or reused. By contrast, other advanced economies in the world such as Japan and Germany depended largely on incineration and recycling for waste management instead (Figure 1).\(^3\)
History of Waste Management in Hong Kong

Hong Kong’s waste management strategy evolved over the past few decades. In the 1980s, Hong Kong relied heavily on both landfills and incineration. However, all five of the city’s incineration plants (with capacities from 10 to 900 tonnes per day) were eventually shut down due to health concerns.

The EPD was subsequently established in 1986 to “formulate policies and plans on environmental protection, energy conservation and the promotion of sustainable development.” The first major plan by the department was to establish a number of waste transfer stations in different districts together with three new strategic landfills in North East New Territories (NENT), South East New Territories (SENT), and West New Territories (WENT) (Exhibit 1). These developments were part of the Waste Disposal Plan initiated in 1989.

In the 1990s and 2000s, there was a policy shift to place greater emphasis on, and create more options for, waste reduction and recycling. A number of waste reduction plans were launched, including:

- The Waste Reduction Framework Plan (WRFP) in 1998, which set up waste separation bins below public housing apartment blocks;
• The *Policy Framework for the Management of Municipal Solid Waste in Hong Kong (2005-2014)*, which set up programmes that, among other things, encouraged 17,000 private residential buildings to provide waste recycling facilities on each floor;\(^6\)

• The *Product Eco-Responsibility Ordinance* in 2008, which implemented a popular Environmental Levy on Plastic Shopping Bags from 7 July 2009. This levy was initially limited to 3,000 retail outlets and set at a minimum of HK$0.5 per plastic bag.\(^7\) The scope was subsequently expanded to 10,000 retail outlets in 2010 to improve its impact.

The Eco Park was established in the 2000s in Tuen Mun to recycle mainly plastic and electronic waste. Large parts of the Eco Park were provisioned with the necessary recycling infrastructure and leased to recycling-related organisations at reasonable rates to develop the local recycling industry.\(^8\) However, the Eco Park was criticised for lack of transparency and direction. According to a report published by Professional Commons, the government never disclosed the actual amount of waste recycling and recovery at the Park. Also, the project was delayed due to prolonged negotiations regarding land tender.

**Funding and Education Campaign**

The Environment and Conservation Fund (ECF) and its fund committee were set up in 1994 to evaluate and fund projects by local non-profit environmental organizations. The capital received by the ECF increased from HK$50 million in 1994 to HK$5 billion in 2013. In March 2012, 80 applications were processed to fund the creation of centralised distribution points for school meals to reduce municipal waste.\(^9\) Recently, the ECF also provided funding for the extensive Food Waste Recycling Program, which covered 4 housing estates.\(^10\)

The “Reduce Your Waste and Recycle Your Plastics Campaign” in 2012 was a significant education campaign co-organized by the EPD, the Education Bureau, the Environmental Campaign Recycling Centre, and the Yan Oi Tong Eco Park Recycling Centre. The campaign provided schools with educational kits and waste separation facilities; and gave out awards to schools with satisfactory performances.\(^11\) The government also collaborated with several environmental organizations to host a series of forums at primary and secondary schools to discourage disposable lunch-boxes.

**The Food Waste Crisis**

Over the past few decades, the Hong Kong government implemented different policies to lower the city’s landfill dependence. For example, waste reduction and waste recycling were actively
promoted. However, the outcome of these policies seemed unsatisfactory. We explore some possible reasons in this case study.

According to the EPD, 10,345 tpd (tonnes per day) of MSW were disposed at Hong Kong’s three strategic landfills in 2016, 35 per cent of which (3,600 tonnes) was food waste (Figure 2). On a per capita basis, Hong Kong generated much more food waste than other Asian cities like Seoul. Hong Kong produced 0.13 tonnes of food waste per person per year, compared with 0.07 tonnes per person per year in Seoul (Figure 3). Food waste, which came mostly from commercial sectors and food industries, consistently accounted for the largest share of MSW in Hong Kong.

Institutional efforts to reduce food waste made a noticeable difference. “Food Wise Hong Kong” was a large campaign by the EPD to encourage businesses in the hotel and food & beverage (F&B) sectors to reduce food waste by offering better portioned meals along with adopting other food waste reduction measures. However, the campaign had a limited impact. Out of around 17,000 restaurants in Hong Kong, only about 700 (or 4 per cent) participated in the campaign.

Restaurants, hotels, and catering businesses in Hong Kong were collectively quite powerful. These businesses were wary that donating untouched food or adjusting food procurement practices could affect their reputation and image, and would rather deal with the disposal of food waste than change their processes to reduce it.

Figure 2: Food waste of Hong Kong, Taipei and Seoul from domestic sources (per year) (Source: Environment Bureau)
To address the waste crisis, the government proposed three major measures, each of which caused some controversy. These measures and the interest groups they affected are discussed below.

Controversy 1: Disputes over the Location of the Integrated Waste Management Facility

The Integrated Waste Management Facility, also known as the Mega Incinerator, was originally proposed to be built on Shek Kwu Chau, an island south off Lantau. Secretary for the Environmental Department Wong Kam Sing stressed the importance of prioritising this project. Unfortunately, the proposal came under heavy criticism, exposing various weaknesses that warranted further attention.

Outrage among Cheung Chau residents

District council members and representatives from neighbouring islands, mostly residents of Cheung Chau, heavily criticised the plan out of concerns about pollutant emission and residual ash leakage. Besides the direct environmental impact, emissions and leakages could also harm Cheung Chau’s socio-economic well-being. According to medical experts, the harmful health effects of incinerators were mainly caused by dioxins and airborne particulate matter. These pollutants had been linked to cancer, heart disease, and asthma. Researchers also confirmed a link between birth
defects and proximity to incinerators. While Cheung Chau had transformed from a fishing village to a modern tourist destination, a significant number of Cheung Chau residents were still engaged in traditional seafood-related industries. Cheung Chau Tai Sun Street Kaifong Society Chairman Johnny Hung strongly opposed the incinerator because of potential harm to nearby fishing grounds. Besides the pollution from the incinerator when in operation, seabed dredging during the construction phase could also worsen the water quality and affect the quality of harvested seafood. More importantly, Hung contended that the project’s Environmental Impact Assessment had been based on an outdated benchmark.

**Outdated technology in the world’s most expensive incinerator**

The estimated construction cost of the mega incinerator ranged from HK$8 to 13 billion. This would make it the most expensive—and largest—incinerator in the world. The government was accused of financial imprudence in building such a large incinerator. Cheung Chau Kaifong Society member Ms. Kwong Wai-kuen opposed the notion, pointing out that the government had neglected to consider a lower cost incinerator that could have been located at Tsang Tsui Ash Lagoon.

The debate over the proposed incinerator heated up further when environmental activists objected to the supposedly outdated incineration technology. Under the government’s proposal, the incinerator would operate at 850°C. This was in contrast to modern plasma gasification incinerators used by other countries that operated at up to 10,000°C and produced no leftover ash.

Netherlands was one of the countries that had adopted plasma gasification. Herman Huisman, senior adviser on international co-operation for the Dutch Ministry of Infrastructure and Environment, said that the cleanliness of these incinerators meant that there was no need for the Dutch government to compensate nearby residents. The Dutch government had managed to convince its citizens that advanced incineration technologies could minimise the negative environmental and health impacts. These efforts transformed the negative impressions previously held by the Dutch, who now considered incinerations plants as normal and acceptable as other public buildings such as hospitals, police stations, or schools.

**Controversy 2: Tseung Kwan O Landfill Expansion Disputes**

In 2016, Tseung Kwan O landfill became the first landfill in Hong Kong (out of the three in operation) to reach capacity. This prompted the public to give serious consideration to its proposed expansion. Diverging views were expressed in the discussions that took place from 2013 to 2014.
Opposition from Lohas Park residents and Pan-democrats

Lohas Park was often cited as evidence of how urban planning in Hong Kong had gone wrong. Although this private housing estate in Tseung Kwan O district had been promoted by developers as “The Healthy City”, it was in fact located close to a massive landfill—the hundred-hectare SENT Landfill. Between Lohas Park and the massive landfill was a dusty road called Wan Po Road. Ironically, “Wan Po” meant “environmental protection” in Cantonese.

After experiencing deteriorating hygiene and air quality, Lohas Park residents unsurprisingly strongly opposed expanding the SENT landfill. Roughly 100 residents participated in a demonstration march along Wan Po Road from Lohas Park to Tseung Kwan O MTR station.22

Figure 4: Tseung Kwan residents participating in demonstrations
(Source: South China Morning Post23)

These residents were joined by district councillors and pan-democrats. Sai Kung district councillor Christine Fong Kwok-shan, who represented Tseung Kwan O district, expressed sympathy with Lohas Park residents and said that the expanded landfill could have negative health effects in addition to creating an overwhelming smell. Fong subsequently proposed a judicial review to pressure the government into abandoning its expansion plan.24 Pan-democrats also strongly opposed the plan. Kenneth Chan Ka-lok of the Civic Party said that expanding the SENT Landfill would reduce the urgency for the EPD to come up with effective waste recycling and reduction plans.25

In response, Environment minister Wong Kam-sing said Hong Kong would be “surrounded by rubbish” if the HK$8.9 billion expansion that had been planned since 2003 was not approved.
Wong urged residents living near landfills to consider Hong Kong's broader interests, saying, “If we don't expand our landfills, it won't be long before the city is surrounded by rubbish.”

Expansion plan approved after intense filibustering

The SENT Landfill expansion plan led to confrontations between various political parties, which intensified just as the proposal was about to reach the LegCo for approval.

In contrast to the strong opposition from district councillors and Lohas Park residents, various pro-government political parties supported the expansion plan, albeit to different degrees. The Democratic Alliance for the Betterment and Progress of Hong Kong (DAB), a Pro-Beijing conservative political party, fully supported the proposal. “It is unrealistic for us to wait until waste reduction efforts bear fruit,” said Gary Chan Hak-kan, a DAB member. Meanwhile, Michael Tien Puk-sun, a member of the New People's Party (NPP, another conservative party), said he would back the proposal, contingent on a commitment from the government to divert foul-smelling household waste from the Tseung Kwan O landfill to organic waste treatment centres.

Pushing for the plan to be delayed or rejected, pan-democrats jointly participated in a “non-cooperation campaign”. They tried to pressure the government into coming up with a better proposal by filibustering LegCo debates. Debates on the expansion plan dragged on for 23 hours across 10 meetings from October 3, 2014 to December 5, 2014. Despite the filibustering, the expansion plan passed with 33 votes for and 19 against.

Controversy 3: Polluters’ Pay Scheme

A new MSW charging scheme introduced in 2019 was welcomed by most environmentalists. The environmental group Greeners Action supported this policy change as it would charge households and businesses according to the amount of rubbish they generated (See Exhibit 2 for a comparison of polluters’ pay schemes across different cities around the world).

Under this new scheme, housing estates, residential building, and shops that relied on government refuse collection services needed to bag at least 80 per cent of their rubbish using nine sizes of plastic bags priced at an average of 11 cents per litre of capacity. Collection of bulky waste such as furniture that could not be bagged or compacted would still be charged according to a “gate fee” arrangement.
A pilot trial in a Tai Po housing estate was tremendously successful. This six-month pilot involving 440 households was conducted by a group at Ming Nga Court (a Home Ownership Scheme estate); and found that pre-paid bags reduced monthly rubbish disposal by about 24 per cent and increased the recycling of 11 different materials by 86 per cent.  

Charging for non-recyclable lunchboxes and disposal water bottles (similar to the plastic bag levy) to reduce waste was also proposed.  

**Overall Feasibility and Administrative Complexity of Waste Charging**

However, many have questioned the scheme’s feasibility. Charging by volume could cause some people to find ways to avoid paying. “Free-riders” might pursue illegal means of rubbish disposal such as fly-tipping. Unlike in Taiwan and Japan, most of Hong Kong’s residential and commercial buildings were high rise; so compliance could be difficult to enforce given the impossibility of identifying the source of improperly bagged waste. Some suggested launching a mechanism to handle reports or complaints from neighbours, but such a process could also cause disputes between neighbours or even family members.  

The administration of waste charging in private housing estates in Hong Kong could prove even more complicated. Private residential and commercial buildings that used private collection services would be required to pay a landfill “gate fee” based on the weight of rubbish disposed. Proposed fees were between HK$365 and HK$395 per tonne. Private housing residents became concerned about the fairness of such fees since the gate fees would be collectively payable and all residents would pay the same amount regardless how much waste they generated individually. Mitigation measures such as regular on-site inspections were not only claimed to be ineffective, but would also be so costly in Hong Kong’s urban context that they would outweigh any additional revenue from waste charging.  

**Summary**

A wide range of policies were introduced by the Hong Kong government in past decades to solve a mounting waste crisis. These ranged from funding schemes and educational campaigns to landfill expansion proposals. The government also deployed additional manpower and capital to alleviate the problem. Yet the effectiveness of these policies and actions appeared to be limited. Solving the problems of waste reduction and disposal requires the government to balance competing interest from different stakeholders. Any major breakthrough requires getting this balance correct.
Exhibit 1: Waste Management Locations in Hong Kong

(Source: EPD$^{34}$)
**Exhibit 2: MSW Charging – Overseas Experience**

<table>
<thead>
<tr>
<th>Country/City</th>
<th>Arrangements</th>
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<tr>
<td><strong>Asia</strong></td>
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</table>
| 1. Taipei    |   - Charge according to water consumption since 1991 before the Bag system  
             |   - Bag system started in 2000  
             |   - Free collection for recyclables  
             |   - Renowned for their “膠袋不落地” (No plastic bags on the street) arrangement for which residents carry their bags and line up on street every night to wait for the garbage trucks to arrive and pick up their waste.  
             |   - Further investigation is required as the Bag system seems only to apply to the low-rise areas and not multi-storey buildings |
| 2. Korea     |   - Flat rate before 1995  
             |   - Bag system after 1995  
             |   - Waste generation reduced by 16.6% and recycling rate increased from 15.7% to 43% in 8 years from 1994 to 2001. |
| 3 Beijing    |   - Flat rate  
             |   - Urban households living under the poverty line are exempted from the fee |
| 4. Singapore |   - Flat Rate  
             |   - Bulky waste disposal are arranged separately. |
| 5. Japan     |   - Waste collection systems vary from place to place  
             |   - Tokyo collects household waste **for free in general** while waste separation is encouraged (no information on latest development)  
             |   - Some places charge according to quantity, some adopt a fixed rate approach and some adopt a mixed approach. |
| **North America** |              |
| 1. New York City |   - Hidden charge through **local property tax**  
             |   - Incorrectly sorted waste will not be collected |
| 2. Seattle   |   - For low-density apartments, households are charged based on their **bin size** (Bin system).  
             |   - In the case of high-density apartments, different arrangement is made and the building owners are charged |
| 3. San Francisco |   - Buildings with 5 or fewer units (50% of residential units) under the PAYT (pay as you throw) bin programme  
<pre><code>         |   - Bin system is **not** applied to residential buildings with large number of households. |
</code></pre>
<table>
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<tr>
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<th>Flat rate (for fixed number of bins or bags) plus charge for additional arrangement.</th>
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**Europe**

1. The Netherlands
   - Flat rate, bag system, and charging by actual weight are all used
   - Some municipalities collect municipal waste charge on the size of the household or frequency of collection, some use the “pay by bag” system and one or two by weight
   - Different nature and set-up of the local community and accommodation may require different charging arrangements

2. Milan
   - Combined flat rate and waste weight
   - A fixed charge based on the type and size of the property and a variable charge based on the amount of the waste collected from each household

3. Sweden
   - Bin system
   - Households are charged on their utilities bill on the size of the bins

**Australia & New Zealand**

1. Sydney
   - Bin system
   - A base fee for a standard set bins and additional charge for extra bins for each household

2. Christchurch/New Zealand
   - Bag system
   - Each property is allocated with 52 rated-funded bags each year with extra bag at $5 each.

(Source: EPD$^{35}$)
Endnotes


4 Ibid.


19 Ibid.


23 Ibid.

24 Ibid.


26 Ada Lee. “Hong Kong issues dire warning.”

27 Cheung Chi Fai. “Lawmakers split.”


