

**Japan-East Asia Network of Exchange
for Students and Youths Programme
(2015/16)**

JENESYS^{2.0}

**Student Delegate Report
(Group 1)**

Comparison of the environmental policies in Hong
Kong and Japan

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Chapter 1 Treatment and Disposal of Solid Waste in Hong Kong and Japan

Chapter 1.1 Solid Waste Policy in Hong Kong: Landfill

Background

Controversy is raging over whether solid waste policies in Hong Kong are comprehensive enough. Nowadays, there are three landfills in Hong Kong. They are the West New Territories Landfill, South East New Territories Landfill and North East New Territories Landfill.

Features

1. The landfill in West New Territories has the longest operation time. It is located in Nim Wan, Tuen Mun. (Figure a) The starting day of construction is in May 1993. It covers a massive area of 110ha.

The second landfill in Hong Kong is located in Tai Chik Sha, Tseung Kwan O. (Figure b) It was put into service in September 1994. It covers a massive area of 100ha, which is smaller than the New Territories landfill.

North-eastern New Territories landfill is located in Ta Kwu Ling, New Territories. (Figure c) It has been operating since June 1995, covering a massive area of 61ha.

2. There are a number of distinctive features of the above three landfills so as to prevent the problem of environmental pollution. The features as as follow:

| Feature | Explanation |
|---------------------------------|---|
| Landfill Liner System | The landfill sites are lined so that landfill gas and contaminated liquid within the landfill, known as leachate, can be collected and treated to ensure that there will be no untreated discharges from the landfill to the environment. |
| Leachate Management System | Leachate collection pipes are installed near the bottom of the liner layers and are connected to a main pipe that leads to a leachate holding tank. |
| Landfill Gas Management System | Waste degradation generates substantial landfill gas made of several gases and chemicals such as methane which are potential flammable and harmful to health. Facilities have been installed to recover the gas for beneficial purposes or proper treatment such that the environment will not be harmed, including power generation. |
| Environmental Monitoring System | Regular environmental assessment surveys are conducted to ensure that the impacts on the ecosystems are minimized. |



Figure a



Figure b



Figure c

Chapter 1.2 Disposal of Solid Waste In Hong Kong

In this part, two policies of solid waste disposal in Hong Kong, Waste Levy and Recycling Bins, will be introduced.

Waste Levy

Background

Hong Kong people generate enormous amounts of waste, and the trend is increasing. Municipal solid waste production rose nearly 30% –from 5.33 to 6.93 million tonnes – in the 10 years from 2000 to 2010. In 1995, the government proposed waste charging to provide a financial incentive for the public to reduce waste production. The proposal has remained in the research and discussion stage. Early last year, various waste management measures were raised, including building an incinerator and organic resource recovery centres. However, the proposed incinerator can treat 3,000 tonnes of solid waste each day, therefore cannot cope with the 9,000 tonnes produced locally each day – and will produce hundreds of tonnes of toxic ash per day plus potentially harmful emissions. The first and second phases of the organic resource recovery centres are expected to handle 500 tonnes of kitchen waste each day, but the daily disposal of kitchen waste at the landfills reach 3,000 tonnes. Obviously, the suggested waste treatment facilities would not match the current level of waste generation in Hong Kong.

Data of 2010 shows that the recycling rate of domestic waste is about 30%, while that of industrial and commercial waste is over 60%. The figures indicate ample room for improvement in domestic waste recycling. It is also more rational to reduce waste by enhancing recycling, compared to building more and larger waste treatment facilities. In addition, many places around the world have implemented waste charging schemes, with various approaches . Therefore, we favor sooner rather than later implementation of waste charging.

Features

The following are the details about the waste levy scheme, as proposed by the Comission on Sustainable Development:

First consultation document on four different approaches:

| Approch | Content |
|-----------------------|---|
| Quantity-based system | Waste charge is assessed on the basis of waste quantity, which is determined by volume, weight or other mechanisms, such as collection frequency. |
| Proxy system | Waste charge is linked with an indirect indicator of waste generation like water bills. |
| Fixed charge | Not linked to the quantity of waste generated; residents of the same district pay an identical rate regardless of how much waste they produce. |
| Partial charging | Waste producers in the C&I sector are held responsiblle for handling their own waste through engaging provate collectors; they are charged during disposal. |

Second consultation document (on the quantity-based system), with more details:

| Approach | Content |
|---|--|
| Domestic waste by household by volume | Each household will need to use the pre-paid designated garbage bag and bring it to a specified collection point for disposal under monitoring within a prescribed period of time. |
| Domestic waste by building by weight | An agent collects the waste from individual households and pay the government based on weight of garbage disposed by the whole building. |
| Domestic waste by building by volume | An agent collects the waste from individual households and pay the government based on number and/or volume of garbage bin used by the whole building. |

The MSW charging scheme will be implemented within two to three years and it is estimated that each residential unit has to pay a disposal fee of \$30-60.

Recycling bins

Background

Provision of three-colour waste separation bins (3-colour bins) is one of the measures to reduce waste and increase recovery quantity. This measure was introduced under the Waste Reduction Framework Plan launched by the Government in 1998. The Plan aims at extending the service life of landfills, minimising waste requiring disposal, helping conserve the earth's non-renewable resources and increasing the waste recycling rate. Besides, it arouses the public awareness of waste separation and recycling.

Features

Starting from 1998, relevant departments including the Food and Environmental Hygiene Department (FEHD), Leisure and Cultural Services Department (LCSD) and Agriculture, Fisheries and Conservation Department (AFCD) have provided waste separation bins at various public places in Hong Kong. Meanwhile, the Environmental Campaign Committee has distributed 3-colour bins to housing estates for free under the promotion scheme of "Waste Recycling Campaign in Housing Estates". It has also given out waste separation bins to schools free of charge to achieve education and recovery purposes.

Details about the three-colour waste separation bins:

1. When the 3-coloured waste separation bin scheme was first rolled out, the types of recyclables collected were waste paper, aluminium cans and plastic bottles. The slogan "Blue for paper, yellow for aluminium cans and brown for plastic bottles" (藍·廢紙；黃·鋁罐；啡·膠樽) has gained wide community recognition.
2. To enhance the effectiveness of the 3-coloured waste separation bins located at public places, the Environmental Protection Department (EPD) has expanded the types of recyclables collected from the bins. From mid 2005 onwards, in addition to plastic bottles, the public can put all types of clean and dry plastic recyclables into the "brown" bins; and starting from May 2006, in addition to aluminium cans, other types of metal containers can also be placed in the "yellow" bins.
3. To facilitate the collection of more types of recyclables, the Government re-designed the 3-coloured waste separation bins at public places in 2005. The

new design (3rd generation bin) has a larger opening on the top to facilitate the public to put in recyclables of a larger size. The old bins (1st and 2nd generation bins) were replaced progressively as they were worn out. At present, all 3-coloured waste separation bins placed at public places are of the new design.



1st generation
3-coloured bins



2nd generation
3-coloured bins



3rd generation
3-coloured bins

Chapter 1.3 Treatment of Solid Waste in Hiroshima

Background

Treatment of solid waste in Hiroshima is totally different when comparing with Hong Kong. The Waste Management and Public Cleaning Law (Waste Management Law) is one of the utmost important policies to process solid waste. The law established in 1970. The aim of this law is to restrict waste generation and ensure proper sorting, storage, collection, transportation, recycling and disposal. Nevertheless, we shouldn't neglect the paramount important purposes (or their final goals) are preventing waste generation, promoting proper waste management and maintain a clean living environment. According to the law, two types of waste are mainly divided. They are industrial waste and general waste. In this chapter, we will focus on treatment of municipal solid waste.

Features

1. Types of Waste in Japan:

Waste → Industrial waste
→ General waste → Industrial Waste
→ General waste → Excretion
→ Solid waste → Commercial waste
→ Domestic waste

In order to deal with the waste problem in the early 90s, the Japanese government sketched out some projects and policies to reduce waste. Because of the successful outcome, these policies have promoted in Japan comprehensively. It should be noted that later, the industry of treatment of municipal solid waste, has become a new income for the Japanese government.

2. Be noticeable that each municipality in Japan control the treatment of solid waste individually. The municipality has the responsibility to gather, transport and process general waste, each village, town, and city has its choice of applying the refuse charge system or not, setting the price of specified garbage bags, classifying the types of waste and the collection dates in different sections of the area. It is the facts that whether the environment is hygienic or not depends on citizens' action and their environmental consciousness. Therefore, the system has become part of the people's daily life.
3. In Japan, two ways are provide to pay for the waste; they are bag-method and sticker-method. In terms of the bag-method, the waste must be packed in specified bags which different capacities are provided for purchase by the government. Most of the bags are colourless or half-transparent so that the waste separation will be done easier. As the municipalities can have their own twist on the system, some of them may apply a registered system on the bags, in order to prevent illegal disposal. The second method is the sticker. Usually, when a large waste, for example: furniture is thrown away, the owner has the responsibility to put a special sticker with the personal information on it.
4. The process of municipal solid waste in operation:
Domestic waste → collection and transport by the municipality → processing / disposal

When a product is made, people are encouraged to reuse it until it is broken, then after it had become a waste; it is collected and processed by the municipality, and finally disposed. There are mainly three methods:

- A. Incineration
 - stoker type incinerator
 - Gasification melting furnace
 - Gasifying reforming furnace
 - Refuse Derived Fuel(RDF)
 - plastic oilification
 - B. Land/sea filling
 - Final Landfill Site
 - C. Others
 - recycling /recycling of compost methane
5. The total weight of general waste produced in japan is about 44million tons, which means each Japanese people produces almost 1 kg of waste every day. At the end of the year, 98.6% of the waste had been processed, including recycling, incinerating and etc. And over20%of the waste (9.26 million tons) was recycled during the year. Only 1.4% were not processed and were directly disposed to the final landfill site
6. There are 1173 incinerators in japan today and they can process 182 thousand tons of waste every day in total.

Chapter 1.4 Disposal of solid waste policy in Japan: Hiroshima City Naka Incineration Plant

Background

As a part of the city's 'Hiroshima 2045: The City of Peace and Creation' project, Naka Incineration Plant was constructed in 2004, designed by a world-renowned Japanese architect, Yoshio Taniguchi, at the expense of approximately HK\$400 million. It covers a massive area of 490,000 square feet. It is expected to deal with the solid waste produced by the town's total population of 1.1 million.

Features

1. With the ocean at its front and the cityscape of Hiroshima at its back, the plant also consists of a corridor that exhibits the history of this construction project, and parts of the internal structure of the incineration system. Dubbed by the architect his 'Museum of Garbage', the thinking behind this industrial exhibitionism is that if people can see and learn about the waste they produce, they will recycle more consciously, tackling the solid waste problem.
2. With prevention to the problem of environmental pollution in mind, various environmentally friendly equipment and facilities have been installed in the incineration plant. The architecture consists of filtering reactors, wet scrubbers, De-NOx catalyst reactors and other flue gas treatment systems that remove harmful dusts and air pollutants in the flue gas.
3. Part of the wastewater and rainwater is processed to be reused in the facility.
4. A thermal recycling program is adopted in order to utilize the heat energy generated in the process of incineration. The excess heat of the incinerator is used to produce 12.5 MW of electricity to supply air conditioning, water heating system and electricity to the plant, as well as a swimming pool, a fitness center and a health clinic for elderly people in the city. Surplus electricity is sold to a local power company, supporting 20,000 local domestic homes.

Arguments:

Some environmentalists have raised the question about the release of dioxins from the 180-foot rectilinear chimney into the atmosphere. Dioxins are highly toxic and can cause reproductive and developmental problems, damage the immune system, interfere with hormones and also cause cancer. Nonetheless, city officials claim that there is no such a problem. Due to the omnipresence of dioxins, all people have background exposure, which is not expected to affect human health if the amount of the air pollutant is limited.



Chapter 1.5 People's Awareness of disposing solid waste in Japan

Features

In Japan, the rules of disposal of solid waste are different, depending on each local government. In this part of the study, we take Higashihiroshima City as an example. Generally, citizens have to separate their household garbage into the following types:

| Type | Examples |
|-------------------------------------|--|
| Combustible garbage | Kitchen waste, small pieces of wood, paper, cloth, rubber, leather, aluminum foil, crayons, paints |
| Bottles & Cans | Confectionery tins, empty cans and bottles |
| Toxic garbage | Fluorescent tubes, batteries, mercury thermometer |
| Landfill garbage | Glass, pottery, ashes, razors ,plastic chopping boards |
| PET bottles | Plastic bottles for drink, alcohol, sauces, etc. (marked with ) |
| Recyclable Plastics | Plastics, vinyl, polystyrene (marked with ) |
| Newspapers | Newspapers (Including flyers inserted in newspapers) |
| Card Board, Misc. Paper & Magazines | Notebooks, pamphlets, books, sweet boxes, tissue boxes, wrapping paper |

After separation, citizens are required to dispose the garbage as instructed by the government (Figure 1). For normal household garbage, they have to take the household garbage directly to a garbage processing centre themselves. There are two processing centres in Higashihiroshima City. Each of them will only collect certain types of garbage.

One-off large amounts of garbage / Garbage from moving house Take garbage directly to the garbage processing center designated by the city, or have a company with a permit issued by the city transport the garbage for you (this will incur a cost).

Taking household garbage (oversized garbage and other garbage) directly to a garbage processing center yourself

Person disposing of garbage (citizen of Higashihiroshima)

- Separate garbage correctly, and put the garbage into designated bags.
- Be sure to take proof of your residence in Higashihiroshima City (driver's license, etc.) with you.
- Take your garbage to the correct center, as shown below.

- Combustible garbage
- Combustible oversized garbage
- Newspapers ○ Magazines, misc. paper, cardboard

Kamo Environmental Sanitation Center
766-1 Kami-Minaga, Saijo-cho
☎082-426-0820
08:30-17:00 (closed Sundays)

- Non-combustible oversized garbage
- Bottles, cans ○ Recyclable plastic
- PET bottles ○ Landfill garbage
- Toxic garbage

Kamo Environmental Center
427-24 Kunichika, Kurose-cho
☎0823-82-6499
08:30-17:00 (closed Sundays and holidays)

- At the center, drive your vehicle (under 4 tons) on to the weighing machine, and show your identification at the weighing office.
- Follow the directions of the staff when unloading garbage. After unloading, drive your vehicle on to the weighing machine again.
- In the centers, there are large trucks moving around. Please be very careful.
- When taking garden (wood) waste to the Kamo Environmental Sanitation Center, remove all metal items, cut the wood into pieces shorter than 1m80cm (1m30cm for bamboo), and ensure that the wood is less than 20cm in diameter.
- Inquire at appropriate shops regarding items which cannot be disposed of at municipal facilities (tires, agricultural implements, motorbikes, medicines, oil, cans containing paint, items covered by recycling laws, etc.). These items will not be accepted at municipal facilities even if broken up.
- Construction waste and demolition waste from a business is industrial waste, and cannot be accepted.

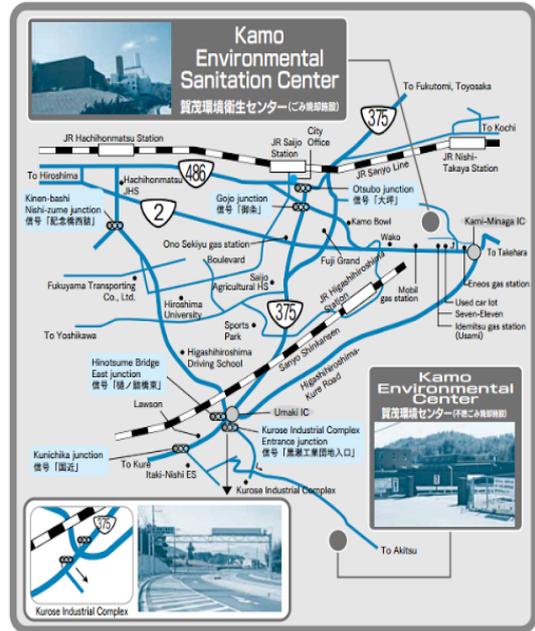


Figure 1 A leaflet about disposal of waste published by the government of Higashihiroshima City

In addition, there is a schedule for household waste collection (Figure 2). The waste will only be collected on certain days of a month and only a certain type of waste will be collected on each day.

The adoption of such a waste disposal process reflects the self-discipline of the residents in managing their waste and their high awareness of protecting the environment.

Besides, according to the City's local government, PTAs and local children's groups are involved in recycling activities. Citizens have to cooperate in reducing waste by leaving newspapers, magazines, fabrics, bottles, aluminum cans, cardboard, etc. for them to collect, instead of disposing of these items as garbage. Not only does it show that citizens have high awareness of reducing waste and contributing to the community, but it also implies that the local government pays much attention to environmental protection.



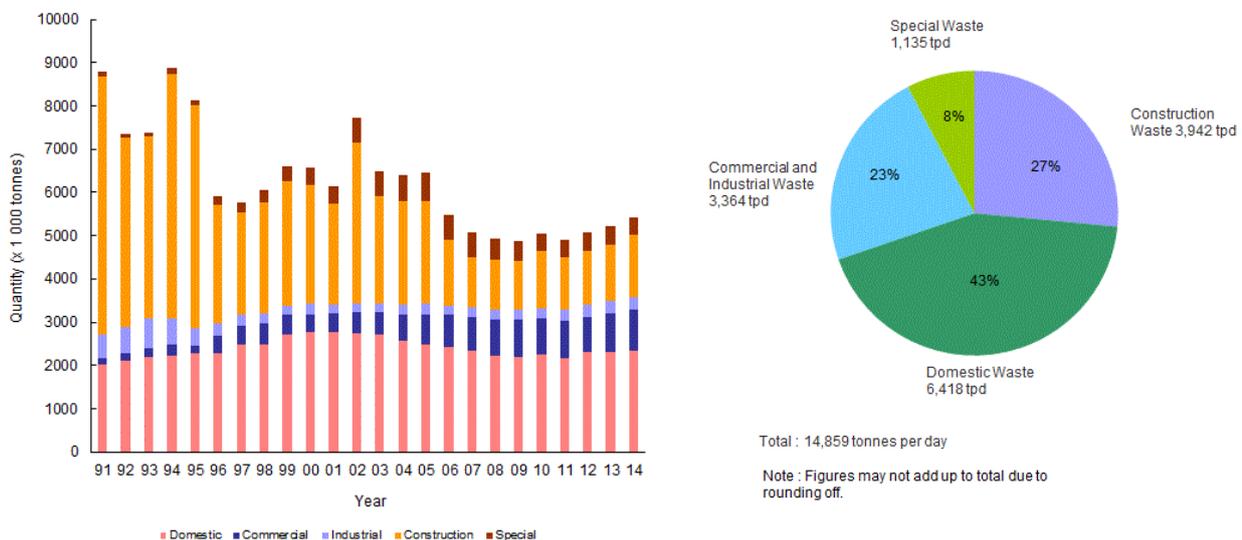
Figure 2 The Household Waste Collection Schedule of Higashi-Hiroshima City for 2015

Chapter 2 Comparison of the Solid Waste Situation in Hong Kong and Japan

Chapter 2.1 Hong Kong's Situation of Solid Waste

Hong Kong is an international trading hub with more than 7 million people living there. The production of solid waste is 2.67kg, which is crowned the first in the world.

The total amount of solid waste disposed fluctuated from 1991 to 2006. Starting from 2007, the quantity (x1000 tonnes) increased gradually from 5000 (x 1000 tonnes) in 2007 to 5300 (x 1000 tonnes) in 2014. In other word, the amount of solid wastes has been increasing recently. Solid waste in Hong Kong include different types of wastes. Domestic waste occupied about 40% of the solid waste. Construction waste took about 30% of the solid waste while commercial and industrial waste took 20% of the solid waste. Other special waste occupied 10% of the solid waste.



Since the 1950s, Hong Kong Government has been providing landfill as a major solution of handling the disposal of solid waste. Yet, land is scarce in Hong Kong. Thus in the 1980s, the Government started arranging larger land to meet the growing waste disposal demand in the future. At last, three modern landfills with a total disposal capacity of 140 million cubic meters at Ta Kwu Ling, Tuen Mun and Tseung Kwan O were commissioned in 1993 to 1995. The average amount of rubbish generated by each person in Hong Kong every day is 1.36kg. With such a huge amount of solid waste in Hong Kong, the landfill at Tseung Kwan O was expected to hit the saturation point last year and the landfills at Ta Kwu Ling and Tuen Mun are expected to hit the capacity by 2019.

In fact, disposing solid waste by landfill is an unwelcome solution. Many people, including environmentalists and citizens are against the policy. Residents want the landfill closed permanently, saying that the smell could be overwhelming and affect their health. About 100 demonstrators marched from Lohas Park to the Tseung Kwan O MTR station, along Wan Po Road. Also, environmentally, the decomposition of solid waste will produce toxic gas and unbearable smell which will affect the

ecosystem.

Discussion on Alleviating the Problem

Building more landfill sites

The Government has suggested building more landfill sites to alleviate the saturation of the existing landfills. Nevertheless, some Hong Kong people oppose the proposal as this solution is just a temporary one and cannot solve the problem in long term. Also it is hard to find a large piece of land, especially when people are fighting hard to build more housing estates to solve the severe housing problem.

Building incinerator

Incineration involves the combustion of organic substances in waste materials. By burning the solid waste into ash, it can reduce the size of the rubbish before it is sent to the landfill. The heat generated can also be used to generate electricity. On the 11 November 2010, the Chief Executive Mr Donald Tsang visited an incineration plant in Tokyo. Hong Kong Government has suggested building incineration. As the landfills are reaching the saturation point, the burning of solid waste can effectively reduce the size of the waste.

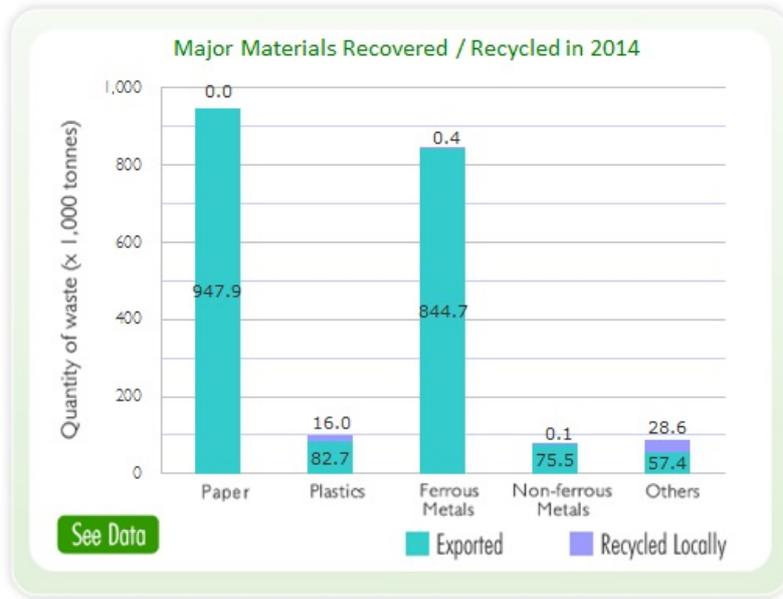
Waste Disposal Charging Scheme

The Hong Kong Government launched the Construction Waste Disposal Charging Scheme in 2005. According to the Environmental Protection Department, through the Charging Scheme, construction waste producers are encouraged to reduce, sort and recycle construction waste so that their disposal costs can be minimized.

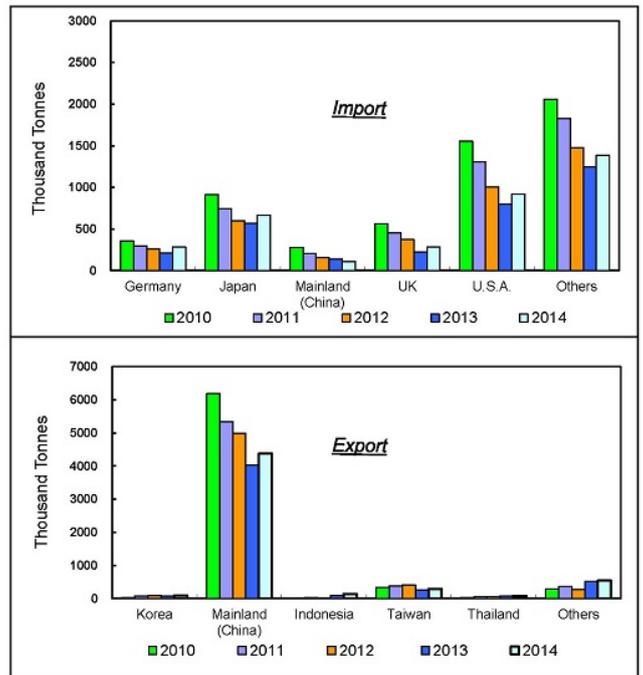
In January 2012, the Environment Bureau released a consultation document on solid waste charging. The charging scheme for disposal of solid waste applies the polluter pays principle and create economic incentives for waste producers to avoid and reduce, and recover and recycle waste.

Promotion of recycling

The Government has been promoting the importance of recycling in the community with the ideas of the 3Rs: re-use, reduce and recycle. This method is effective as it can solve the root cause of the problem, that is the excess amount of solid waste produced by every citizens. The Community Recycling Network collects mainly waste plastics, glass bottles, small waste electrical and electronic equipment and others. Through the existing waste recovery system, about 2.05 million tonnes of solid waste were recovered in Hong Kong in 2014. Among the total, 2% was recycled locally and the rest was exported to the Mainland China and other countries for recycling, with an export earning of HK\$5.5 billion for Hong Kong. Yet, people argue that the education and promotion in recycling may take a long time and is not efficient enough in tackling the problem.



Hong Kong Waste Import and Export Figures (2010-2014)



Chapter 2.2 Present Situation In Japan

Background

In these years, the total output of domestic garbage and the volume of garbage generated per capita in Japan do not have significant change. The rate of recycling and reducing have shown an upward tendency. The processing rate thus decreases.

Incinerating is the main method to deal with the refuse in Japan. Grate furnace and fluidized bed are the major ways of it. Landfill accounts for a very small proportion. Japan still keeps improving the technology to reach the aim of incinerating with high temperature and high efficiency, in order to reduce environmental pollution.

After several decades, some of the waste incineration plants in Tokyo are closed down due to the lessen of refuse.

Solid Waste Problem

Environmental Awareness

The Japanese have a strong sense of protecting the environment. Owing to a resistance movement, two ideas appear in the resident's' mind. First, settle in their own urban. Second, assume the nuisance together. They will not send the trash made in their urban to the other cities but build their own refuse treatment plant.

The importance of environmental problems can be learnt from schools. It includes the shortage of resources and deforestation. Schools will also supervise them to take action. Besides, children will be affected by school and then try to classify as a minister of environmental protection at home. This is how they develop their sense to protect the environment. This helps them to reduce the waste produced.

Outage of Waste Treatment Plants

Because the amount of trash decreases, some refuse treatment plants in Tokyo close down. There are two main causes: the bubble economy and the progress of recycling. The bubble economy leads to the slowdown of economy in Japan, so the garbage is on the decrease. The progress of recycling also leads to it. Moreover, there is a recycling technique for packing. It makes the packing lighter and thinner.

Problem

Japan is a recycling-oriented society, and promotes 3Rs. However, they focus on recycling and it seems they ignore one of the Rs: reuse. There is still a problem that the packing of the products is too much. It is a kind of waste. But the government has carried out a policy which has been mentioned before to solve it already.

How do the treatments help prevent the excess garbage?

In 2011, six Japan cities were selected as top 50 most environmental friendly cities. Why Japan is praised as a green country with only little rubbish existing? We are now going to explain it in the perspective of the treatment of waste.

Like many countries, Japan has adopted landfill policy to store the waste. Since spacious spare places in Japan are adequate, the policy can be well performed in Japan without damaging the neighbouring environment of the local residents and facing too much opposition from affecting districts. However, the portion of this

method only consists of 17% of the refuse. The most prominent practice is using the incinerators. 78% of garbage was burnt with a principle “high technology, safe and hygienic, no pollution, economical”, reducing lots of money and time spent and air pollutants emitted, thus establish a sustainable choice to get rid of rubbish. These two methods do help Japan a lot to cope with waste problem.

Besides, Japan government has also implemented policies to cut down on rubbish production. Although 3R (recycling, reusing and reducing) is only efficient to 5% waste, waste reduction at source can save the materials. Different types of garbage are separated by different bins, so that the collection of reusable resources can be less time-consuming and convenient. Nevertheless, 3R principle has been practicing in different countries in recent years, but the outcomes are not satisfactory. That’s because of the education received and moral values behind the citizens are totally not the same. Japan always promotes the idea of “green”, so Japanese are more self-disciplined and they will throw the refuse correctly and actively to the corresponding recycling bins, thereby lowering waste production from its origin. Moreover, legislation gives an account to the success. It creates economic incentive to Japanese as rubbish bags are charged by the government so they are more willing to produce less domestic waste so as to pay less money in consideration of their own benefits.

All in all, the above four treatments that done by the Japanese government give explanations to the prevention of excess waste and they functioned superbly excellent to reduce waste.

Chapter 2.3 Can Hong Kong Adopt Japan's Policies?

As Hong Kong is facing the threat of landfill saturation, many suggestions are given to solve the problem. Japan has been effectively managing the waste disposal with minimal pollution to the environment. Yet, much public controversy may probably be provoked if Hong Kong is advised to adopt Japan's strategies.

Incineration Plant

Before the 1990s, there were four major incineration plants in Hong Kong, which are the Lai Chi Kok incineration Plant, Kennedy Town Incineration Plant, Mui Wo Incineration Plant and Kwai Chung Incineration Plant. They were decommissioned in the 1990s due to the severe air pollution caused. Whether incinerator should be built again has stirred up a hot debate. With technological advancement, new type incinerators are allowed to burn the waste without causing any pollution.



Kwai Chung Incineration Plant

From the environmental aspect, Hong Kong should follow the example of Japan. Hiroshima City Naka Incineration Plant processes 400 tons of waste every day, which will be very effective at dealing with the solid waste. Filtering reactors, wet scrubbers, De-NO_x catalyst reactors and other flue gas treatment systems that remove harmful dusts and air pollutants in the flue gas³ are installed in the plant which ensures that the materials released will not contain any harmful substances. Moreover, a thermal recycling program is adopted in order to utilize the heat energy generated in the process of incineration. The excess heat of the incinerator is used to produce 12.5 MW of electricity. If it is adopted in Hong Kong, it can be included as one of the elements in the fuel mix and the pollution caused by coal burning can be solved at the same time. Therefore, it will be very effective in dealing the solid waste and alleviating landfill's pressure.

From the economic aspect, considerable benefits may be obtained in a long term. US\$400million (about HK\$3.12 billion) had been used in the commissioning of the Hiroshima City Naka Incineration Plant, which is quite an enormous amount of money. The Hong Kong government has also stated that HK\$150 billion is expected to be used for the construction of the incinerator. The money needed may be huge, but many economic benefits can be brought by an incineration plant. Take the Naka Incineration Plant as an example, not only can it be used for public education, it is also an incredible architecture, which attracted quite a lot of people to go to the city and to visit the plant. Hong Kong's status as an important financial source of China has been vacillated since the rise of other mainland metropolises, such as Shanghai. An high-tech incineration plant will be able to increase the fascination of Hong Kong in attracting more tourists. It can diversify the kinds of attractions in Hong Kong. It increases tourism and in terms helps the economic development.

From the social aspect, the electricity generated by the excess heat from the incinerator can provide electrical subsidies for the residents nearby. Most Hong Kong citizens have the misconception that incineration plants will threaten their health, but the new type incinerators can totally avoid the problems. Residents strongly disagree

with the decision of building an incinerator in Shek Kwu Chau and Tuen Mun. It is suggested that one third of electrical bill can be subsidised as a compensation for residents nearby.

However, reclamation is still needed to create land for building incineration plant. Reclamation will further pollute the ocean and harm the marine lives. It also further destroys the coastal line.

Refuse Charge System

Although building incinerators can alleviate the saturation problem of the landfills, it cannot tackle the root problem of the large disposal of solid waste. Refuse charge system adopted by Japan can tackle the problem. Nevertheless, there are pros and cons in adopting the system in Hong Kong.

Through purchasing different size of garbage bags sold by the government, each household will be charged according to the size of its garbage bags which indicates the amount of rubbish it has. This encourages people to produce less solid waste.

However, it depends highly the amount charged by the government. If it is too low, it may not be deterrent enough to make people reduce the production of waste; if it is too high, people may think of other ways to dispose waste, such as throwing the domestic waste into the rubbish bins on the streets. In addition, other supporting facilities are needed in order to ensure that the system can be carried out smoothly. For example, different disposal areas for different kinds of domestic waste have to be built. Moreover, charging some grass-root family will add even more financial burden on them. Subsidy may be needed for some families.

Therefore, refuse charge system needs to be carried out carefully and consider comprehensively before its implementation so as not to bring negative impacts to the society.

Raise public awareness of 3-Rs

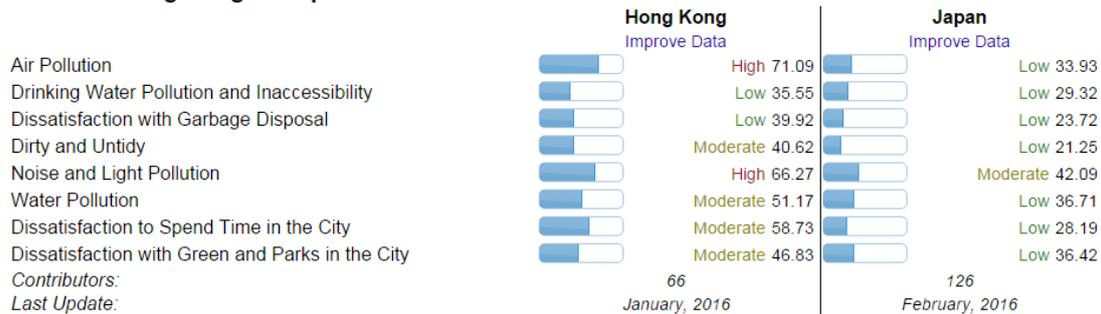
Japanese are educated with the idea of 3Rs at childhood. That is why they have a strong sense of recycling materials. I think Hong Kong government should definitely strengthen the education on 3Rs as Hong Kong people seldom have the awareness of recycling things and reusing things. This will enable Hong Kong people to be more environmentally friendly as well.

Specific policies like replacing the traditional rubbish bin with recycling bins, making it mandatory for all schools to have recycling bins should be carried out in order to develop people's sense of recycling materials.

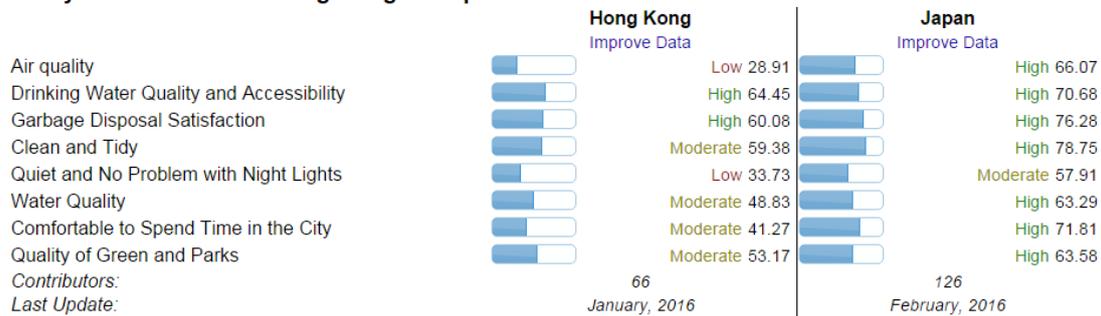
Chapter 3 Air Pollution Problem in Hong Kong and Japan

The air quality and pollution problem between Hong Kong and Japan:

Pollution Hong Kong vs Japan



Purity and Cleanliness Hong Kong vs Japan



According to the above data, the air pollution index of Hong Kong is estimated two times that of Japan, while the air pollution of Hong Kong belongs to the group of "High" in the figure. As for the air quality aspect, the air quality of Hong Kong is quite low. When compared to the air quality of Japan, the air quality of Hong Kong is lower than Japan by about three times.

Therefore, based on the figure, it revealed that the air pollution problem of Hong Kong is much more serious than Japan.

| Index ⓘ | Hong Kong | Japan |
|----------------------|-----------|-------|
| Pollution Index: | 67.74 | 37.89 |
| Pollution Exp Scale: | 122.09 | 61.38 |

Chapter 3.1 Roadside Air Pollution - Common Measures adopted in Hong Kong and Japan

Background

As cities compose of a large number of roads and streets, roadside air pollution undeniably contributes a big part in causing serious air pollution. In recent years, Hong Kong and Japan have been adopting different methods to monitor and tackle the problem of air pollution. Amongst all, there are some common ways used by both governments to monitor the condition of air pollution, including the operations of General Air Pollution Monitoring Stations and Roadside Air Pollution Monitoring Stations.

Features

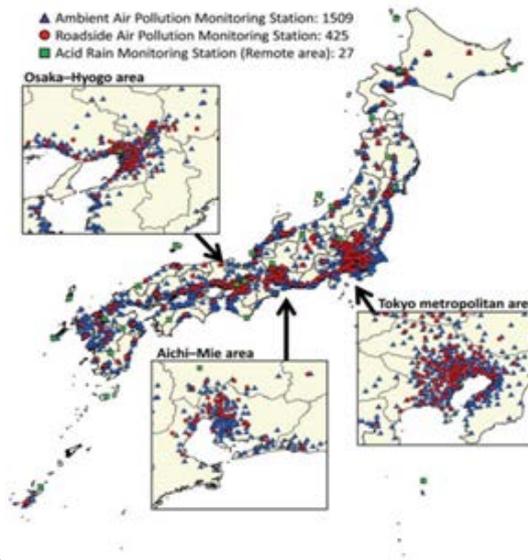
1. Hong Kong - 12 General Air Pollution Monitoring Stations & 3 Roadside Air Pollution Monitoring Stations

The Environmental Protection Department of Hong Kong continuously measures the pollution levels with the use of its comprehensive air quality monitoring network. The stations are often operated and built to comply with the highest standard of accuracy, which mainly serves for the following purposes:



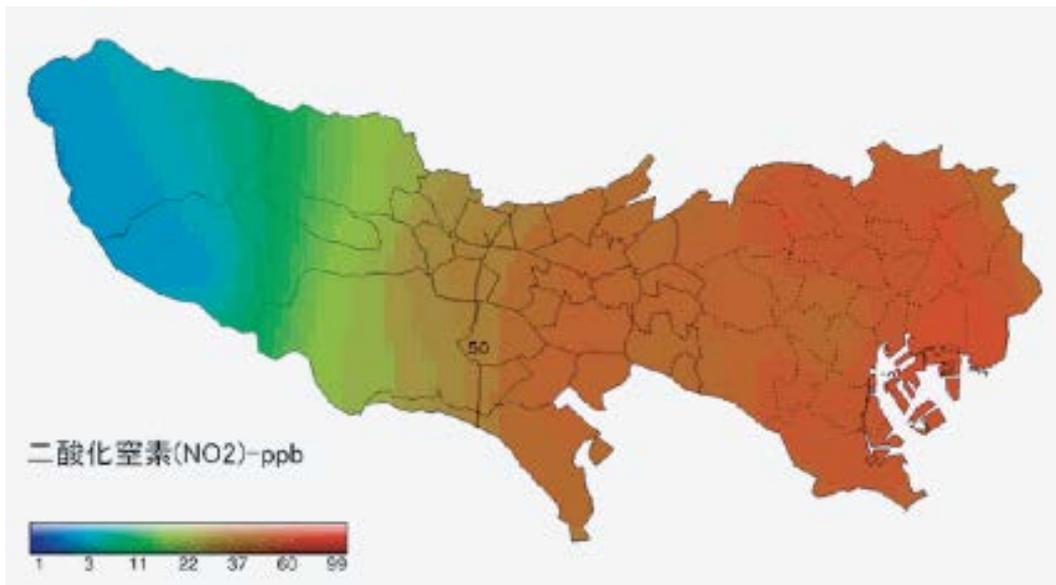
- To understand air pollution problems in order that cost-effective policies and solutions can be developed
- To assess to what extent the standards and targets are being achieved or violated
- To assist the assessment of public's exposure to air pollution
- To provide public information on current and forecast air quality

2. Japan - 1509 General Air Pollution Monitoring Stations & 425 Roadside Air



Pollution Monitoring Stations

All Air pollution monitoring stations are established in 15 major areas across Japan. Its comprehensive network allows efficiency of monitoring the condition of air pollution in the entire nation, so as to monitor residents' health when living in the neighbourhood.



Chapter 3.2 Roadside Air Pollution - Major Environmental policies adopted in Hong Kong

Background

Hong Kong is an international city with a huge sum of more than 7,000,000 citizens as the population. In modern societies, transportation is undoubtedly an essential tool when transporting from one place to another. Thus, the number of people using transportations could be a critical problem that causes air pollution.

Features

1. Air Pollution Index (API)

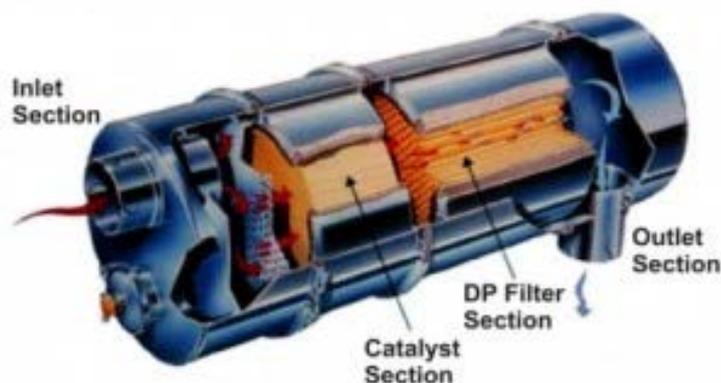
The Air Pollution Index (API) is a simple way of providing timely information about air pollution to the public. It informs the general public of the short-term health risk of air pollution of a particular day. Preventive or precautionary measures and advices would also be provided by the API to help protect citizens' health. It is reported on a scale of 1 to 10 and 10+. They are grouped into five health risk categories as shown below:



2. Control of vehicle emissions

The HKSAR Government has been adopting different measures in tackling the problem of air pollution. Since 2000, a Comprehensive Vehicle Emission Control Programme has been introduced to reduce vehicle emissions. There are mainly 5 initiatives in the programme:

- More stringent fuel and vehicle emission standards



- Increased vehicle emission inspections and enhanced enforcement against highly polluting vehicles
- Encouragement to adopt cleaner alternatives to diesel vehicles, such as the use of liquefied petroleum gas for taxis and light buses
- Installation of old diesel vehicles with devices that, reduce emissions such as particulate traps or catalytic converters

- Promotion of better vehicle maintenance and eco-driving habits



3. Promotion of Electric Vehicles in Hong Kong

The government has introduced a HK\$300 million Pilot Green Transport Fund since March 2011 for application by transport operators and non-profit-making organizations, so as to encourage them to try out innovative green and low carbon transport technologies.

Example: The Hong Kong Productivity Council and Hong Kong Automotive Parts and Accessory Systems' Research and Development Centre has recently designed and developed a 12.5-tonne single deck electric bus, which can help improve roadside air quality and reduce greenhouse gas emissions effectively.

Background

Despite the fact that vehicles enhance the convenience of our lives, they may cause air pollution to the environment due to the emission of greenhouse harmful gases. There is certainly a dire need for Japan to reduce its diesel vehicle exhaust, as according to statistics, approximately 50% of Nitrogen Oxides emissions and nearly 25% of particulate matter emissions are from vehicles in Japan, including construction machineries and other kinds of transportations. Japan has been using various methods to improve and tackle the pollution problem in Japan.

Features

1. *Diesel Vehicle Emission Regulations*

Diesel vehicles that do not meet the emission standards of Particulate Matter (as defined in the ordinance) will be banned in the places mentioned above. Vehicles not conforming to the standards are required to be replaced by low-emission vehicles.



2. *Setting up of video cameras on the roads and streets of Japan*

In order to enforce the regulations more strictly and effectively, video cameras have been set up by the Japanese government. Vehicles violating the regulations would be imaged and recorded.

3. *Vehicle inspections on the streets*

Diesel vehicles in violation of the regulations can be cracked down by means of vehicle inspections on the roads and in truck terminals.

4. *Strict punishment on violation of Diesel Vehicle Emission Regulations*

In order to ensure the effectiveness of the regulations, when driving of vehicles in violation of the regulations is confirmed in Tokyo, police can order the person responsible for the vehicle's operation to suspend driving in the city. After receiving an order of suspending driving, if the person fails to observe it, the violator's name will be made public and that particular driver will be fined of up to 500,000 yen.

5. *Promotion of Low-Emission Vehicles*

In addition to tightening of exhaust emission control regulations, promoting low-emission vehicles like hybrid cars and electric cars would be a feasible way in tackling air pollution in Japan. They emit much less exhaust than ordinary diesel vehicles.

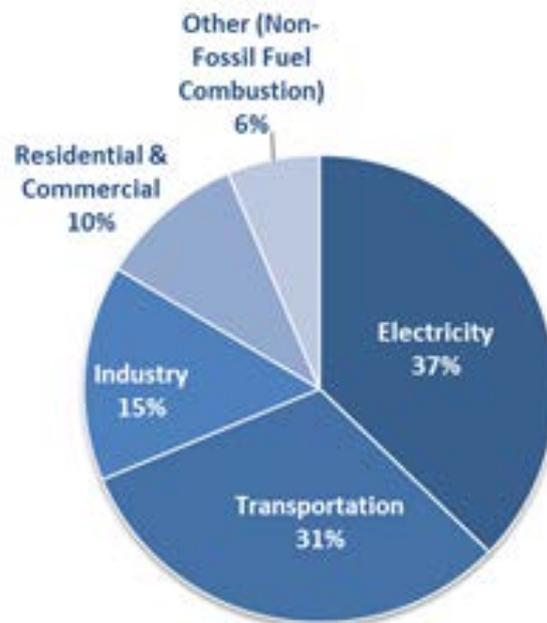
Effort of local citizens in Japan

In Japan, riding bicycle is a very popular way for citizens to travel from one place to another. Every morning, it is often seen that citizens in all ages ride bicycles to school and their workplaces. In this way, less harmful gas emissions would be resulted because of transportations.

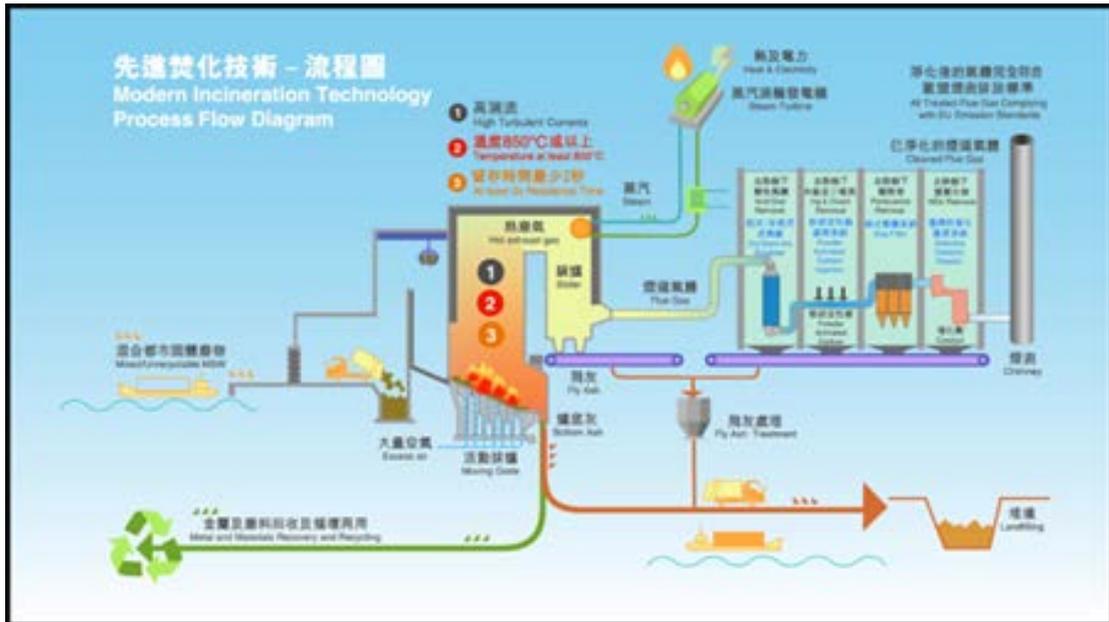
Chapter 3.4 Incinerator - a feasible way to tackle air pollution

Nowadays, living in a well-developed technology world, people use loads of advanced mechanical tools with a view to giving assistance in our daily life. However, the tools certainly increase in the use of fossil fuels which is necessary for over 85% of human energy demands. There is no doubt that air quality is deteriorated due to the rise in combusting of fossil fuels

The combustion of fossil fuel creates different types of air pollution. Burned to create energy for driving cars, generating electricity and running factories, fossil fuels create smog during the burning processes. Smog makes the air looks brown and dirty, even makes people feel sick if they spend too much time outside breathing it in. Besides, several major pollutants are produced by fossil fuels combustion.



It is known that Japan has been doing well in reducing greenhouse gases. For example, Japan mainly disposes the rubbish by incinerator instead of landfills. Despite the fact that carbon dioxide is released when burning trash, 40%-60% methane which is much more harmful is included in landfill gas, resulting in worsening global warming. Moreover, incinerators can generate heat and electricity in a bid to reduce the use of fossil fuels that can certainly help to lessen the greenhouse gas. Perhaps, a major concern associated with incinerating solid waste is the release of harmful gases. Yet, adopting the advanced incineration technology, the Naka Incineration Plant which we visited purifies the gases before emitting. Therefore, treated gas is without doubt released with a view to tackling the air pollution and even global warming.



Waste will be produced as prosperity levels continue to rise, thus filling up the three landfills in Hong Kong within these years. Being a tremendous problem faced by the government and also the citizens, the full of landfills should be resolved as fast as possible. From the experience of Japan, we know that building incineration plant can be one of the measures to solve air pollution and lower greenhouse gas in order to prevent global warming from worsening. Hong Kong is a small city with a large population so the space is automatically valuable. However landfills require loads of space and may have more bad effects compared with incinerator; there is a necessity to build an incineration plant.

Chapter 3.5 Suggestions

What can we do in our daily lives?

1. Use public transports, walk or ride a bicycle as often as possible.
2. Buy products produced in Hong Kong, such as local fruits, in order to reduce air pollution produced during the exporting of products by aero planes, ships, etc.
3. Participate in energy efficiency schemes or programs organized by the government or NGOs.
4. Choose energy-efficient electrical appliances by simply looking for those with high level of energy efficiency on their energy efficiency labels.

What can the government do?

1. Propose more governmental greening works, such as Landscape Rehabilitation.
2. Enhance the public awareness of reducing air pollution through education.
3. Import environmental friendly invention, for example incinerators and electric vehicles.

Chapter 4 Conclusion

Japan has been doing very well at combating solid waste. They are using diversified ways to solve the solid waste problems. Other than landfills, incinerating, refuse charge system and recycling have been used by the Japanese. The effective solid waste treatments enable them to have a clean environment and good air quality. Hong Kong is also a highly developed city like Tokyo in Japan. There is no way that Hong Kong people cannot solve our solid waste problem. We should not pursue economic development at the expense of our environment because a good environment is the foundation of a sustainable city. Therefore, Hong Kong should learn from Japan and find our way out of the plight.

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