



Environmental
Protection
Department

A Policy Framework for the Management of Municipal Solid Waste (2005-2014)



RESPONSIBILITY

REDUCE, REUSE, RECYCLE





A sculpture at Sai Tso Wan Recreation Ground – the first permanent recreation facility built on a restored landfill in Hong Kong



The jogging track at Sai Tso Wan Recreation Ground is paved with recycled material



The wider use of recycled paper is encouraged

The three-coloured waste separation bins



The public is encouraged to use environmental shopping bags



A municipal solid waste incinerator in Japan has an artistic design

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SUMMARY OF ABBREVIATIONS

SCHEMATIC DIAGRAM

USEFUL WEBSITES

PREFACE

In an affluent and developed society such as Hong Kong, environmental issues are rightfully among the top concerns of the community. Since the air we breathe and water we drink directly affect our health, the concerns voiced on these areas are often louder than those on waste management, which is an equally important and perhaps even more imminent problem. Unless we change our consumption-led lifestyle, our landfills will be rapidly filled up in 6 to 10 years. It is clearly not sustainable to keep throwing all our waste to the landfills. A viable set of solutions is high on the agenda of the Government and the community as a whole.

It is therefore my pleasure to publish “A Policy Framework for the Management of Municipal Solid Waste (2005-2014)” at this opportune time. This Policy Framework advocates what we plan to do to tackle our waste problem head-on. Its core message is clear and simple: we must be responsible for what we consume and what we dispose of. We must all be responsible for avoiding, reducing, reusing, recycling and treating waste, and use our landfills as a final repository only for the unavoidable waste after waste treatment.

True to our belief in “big market, small government”, the Policy Framework proposes simple, yet effective, economic tools based on the “polluter-pays” principle that would create incentives for us all to recycle more and throw less. They include measures tried and proven effective in other jurisdictions. We ask you to help make such waste reduction decisions that make sound economic and environmental sense.

We sincerely invite you all to thoroughly discuss and comment on the initiatives and milestones set out in the Policy Framework. Only with your full support can we turn this Policy Framework into reality. We must work together to tackle our waste problem now so that our future generations will not be burdened with cleaning up the mess we leave behind.



Dr Sarah Liao, JP

Secretary for the Environment, Transport and Works



EXECUTIVE SUMMARY



Why Now

Hong Kong has an imminent waste problem. At present, we rely solely on our landfills to dispose of our waste. Although we are recovering 40% of our waste for recycling, our landfills will be full in 6 to 10 years if we do not substantially reduce the generation of waste and cut down the amount of waste we send to the landfills.

The Government Acts

We must address the waste problem in a holistic manner. This Policy Framework sets out a comprehensive strategy consisting of a series of tried and proven policy tools and measures to tackle our waste problem head on and achieve the following targets:


Target 1: To reduce the amount of municipal solid waste (MSW) generated in Hong Kong by 1% per annum up to the year 2014.

Target 2: To increase the overall recovery rate of MSW to 45% by 2009 and 50% by 2014.

Target 3: To reduce the total MSW disposed of in landfills to less than 25% by 2014.

Tackling the Problem at Source

Waste avoidance and minimization are our top priorities. We introduced a territory-wide waste recovery programme in January 2005 to facilitate waste separation at the household level. We aim to expand the scheme to cover **80%** of the population by **2010**, and significantly increase the recovery of our domestic waste. To make proper use of the recyclables recovered, we must have a robust recycling industry locally. In addition to the existing policy of providing land on short-term tenancies, we are setting up the EcoPark for the recycling industry. The EcoPark will come into operation in



late **2006**. Additionally, we will continue to encourage the development of recycling technology through the Environment and Conservation Fund and the Innovation and Technology Fund. In doing so, we will not only reduce pressure on our waste facilities, but also conserve resources and jump-start a circular economy.

Throw less, Pay less

The core of our comprehensive strategy is the “polluter-pays” principle. We propose to introduce producer responsibility schemes (PRSs) that hold the manufacturers, importers, retailers and consumers responsible for what they produce and consume. We aim to introduce to the Legislative Council the Product Eco-responsibility Bill in **2006** to provide a legal framework for PRSs. With PRSs in place, we can consider introducing landfill disposal bans so as to make better use of our landfills as the final repository of unavoidable and properly treated wastes. We also propose introducing legislation on waste charging by **2007** as a direct economic incentive to avoid and reduce waste.

State-of-the-art Treatment

While our proposed policy measures would have substantial impact on waste reduction and recycling, we must face up to the reality that there will still be unavoidable waste that we must handle. We propose to develop state-of-the-art Integrated Waste Management Facilities with incineration as the core technology for final waste treatment. In developing the Facilities, we will adopt the most stringent emission standards to minimize their impact on the environment.

Community Participation

Our comprehensive strategy can only work in partnership with the public. We urge the community at large to fully support this Policy Framework.

CHAPTER 1

THE RATIONALE - WHY NOW

INTRODUCTION

1. Each year, Hong Kong produces millions of tonnes of municipal solid waste (MSW). MSW requires efficient collection, transfer and disposal. In 2004, a total of 5.7 million tonnes were generated, of which 2.3 million tonnes (40%) were recovered and 3.4 million tonnes (60%) were disposed of at landfills. The latter is creating a real and pressing burden on the landfills. At the current rate of solid waste generation, our landfills will be full in 6 to 10 years, posing the question: what do we do with our waste then?
2. **Clearly, Hong Kong must find a system of managing MSW now and in the years to come that is economically, financially and environmentally sound.** As an advanced society, Hong Kong must recognise that tackling its waste problems is part of the much larger challenge of becoming a sustainable city. In response to this challenge, the Government has developed this Policy Framework on the measures to manage MSW, their implications and implementation for the 10 years from now until 2014.



3. But what happens beyond the timeframe of the Policy Framework? We must understand that sustainable development is not about just 10 years, or 20 years, or even 50 years but a long-term quest that will ensure that future generations enjoy the social, economic and environmental benefits that we have now. It is with this fundamental philosophy foremost in mind that the Government has framed the Policy Framework to meet these needs.

THE POLICY FRAMEWORK

4. The Policy Framework describes the urgency of our growing MSW problems, pinpoints what problems and pressures are facing Hong Kong in MSW management, and explains how this strategy impinges on a healthy future. It presses home the reasons for the concerted efforts of the community - households, businesses and industries, as well as the Government - to solve the problems, while outlining measures and initiatives already underway and future plans for discussion and comment.





Waste separation to recover recyclables is simple to follow

5. MSW management is set in the important context of working towards a sustainable future, and the Policy Framework describes how it fits into the process that has led to the Government's first strategy devoted specifically to sustainable development. We set out the strategy developed directly as a result of the engagement process conducted by the Council for Sustainable Development (SDC). We also spell out what individuals as members of households, workers or owners of businesses, and the Hong Kong community as a whole will be required to do to accomplish their shares of the efforts in bringing MSW levels down.
6. That the focus of the Policy Framework is on one kind of waste, specifically MSW, does not imply that other kinds of waste are less important. On the contrary, the Policy Framework gives due consideration to a stream of waste that is significant in its volume, its economic, social and environmental impacts and its implications for Hong Kong's future.

SUSTAINABLE DEVELOPMENT ON MSW MANAGEMENT

7. Growing concerns about Hong Kong's MSW have been voiced at least since 1994. The Waste Reduction Study completed then set out recommendations based on extensive research into policy options and other methods to drastically cut the waste volume. These recommendations were carried forward in the Waste Reduction Framework Plan (WRFP) promulgated in 1998.

8. The Government has been working towards delivery of the targets set out in the WRFPP. We are committed to reviewing the WRFPP, and since we are approaching the end of the planning horizon of the WRFPP, the Government has to formulate a new strategy. In recognition of the scale of the waste problem facing Hong Kong, it was fitting that solid waste management was chosen by the SDC in 2004 as one of three pilot areas, along with renewable energy and urban living space, in the engagement process to obtain stakeholders' views on what might be done to promote sustainable practices in these important areas.
9. Debates, discussions and concerns expressed by business people, community leaders, academics, non-government organisations (NGOs), government representatives, students and members of the general public came to conclusions as follows:
 - We should aim to **reduce waste** in the first place by using fewer materials or avoiding the use of certain materials altogether;
 - We need to accept that there is a financial implication of dealing with waste in Hong Kong and that we should be prepared to **pay waste disposal costs**;
 - Involving businesses through **producer responsibility schemes** (PRSs) will help promote recycling and waste reduction at source;
 - The simple step of **separating our waste** into reusable materials and materials that require disposal will result in more MSW being recovered for either reuse or recycling; and
 - The burden on Hong Kong's landfills can be reduced through **reuse, recovery, recycling** and the use of waste treatment technologies.
10. In its report Making Choices for Our Future: Report on the Engagement Process for a First Sustainable Development Strategy (February 2005), the SDC formalised these points into a set of recommendations on promoting sustainable practices in solid waste management.

Recommendations of the SDC on Solid Waste Management

1. The Government should further promote solid waste recovery and recycling.
2. Legislation for PRSs should be introduced.
3. Solid waste recovery targets of 45% and 50% by 2009 and 2014 respectively should be achieved in Hong Kong.
4. The Government should identify alternative forms of waste treatment, in order to reduce the amount of solid waste that is disposed of in landfills.
5. The Government should introduce legislation on direct MSW charges, in order to encourage households and businesses to reduce the waste volume.
6. The Government should review the current waste management mechanism.

Table 1. The SDC states the wishes of the stakeholders

SUMMARY

11. The importance of using stakeholder-based discussion in the open and broad-based consultation as employed by the SDC cannot be over-emphasised. By allowing the community at large the opportunity to articulate their values and aspirations on waste and on how to secure a sustainable future for Hong Kong, it gives them ownership - and, ultimately, responsibility. Hence, it is possible for all of us to see where and how we fit into the waste generation and management structure.
12. On the Government's part, the process of engagement has provided important insight into both what stakeholders and the wider community understand of Hong Kong's MSW problems, and how they think the problems may best be managed.
13. With this feedback firmly in hand, the Government needs to build on the momentum over this critical process in an area of fundamental importance to all our future : this is the importance of the Policy Framework.



Compost produced from organic waste can replace chemical fertilizer

THE PROBLEM - NEED FOR FIRM ACTION

SHRINKING OPTIONS, GROWING COSTS

- 14.** In 1989, the Government made the critical decision to abandon an out-dated system of urban incinerators located at Kwai Chung, Kennedy Town and Lai Chi Kok and 13 small, inadequate landfills. Our MSW management system currently relies on three large, state-of-the-art strategic landfills in remote parts of the New Territories together with a network of refuse transfer stations (RTSs) and collection services provided by both the Government and private sector. The common perception is that landfills are merely dumps at which solid waste is buried. In fact, they are scientifically designed and highly engineered facilities for managing waste disposal.
- 15.** Hong Kong's three strategic landfills are:
- The West New Territories (WENT) Landfill at Nim Wan;
 - The South-East New Territories (SENT) Landfill in Tseung Kwan O; and
 - The North-East New Territories (NENT) Landfill at Ta Kwu Ling.

These three strategic landfills came on line in 1993, 1994, and 1995 respectively as the retiring landfills and incinerators were phased out by 1997.

- 16.** Hong Kong's waste arisings have exceeded the expected amount. At the time the three-landfill strategy was implemented, it was forecast that the daily amount of waste¹ to be disposed of at landfills would rise from 12,500 tonnes in 1989, to 14,000 tonnes in 1997 and 16,700 tonnes by 2001. But by 1997 the three strategic landfills were already taking in 16,000 tonnes of waste every day. Should this trend continue, the landfills will be full by 2015, instead of lasting until 2020 as they were designed for.

¹ This comprised MSW, construction waste and some special waste (e.g. sewage sludge).



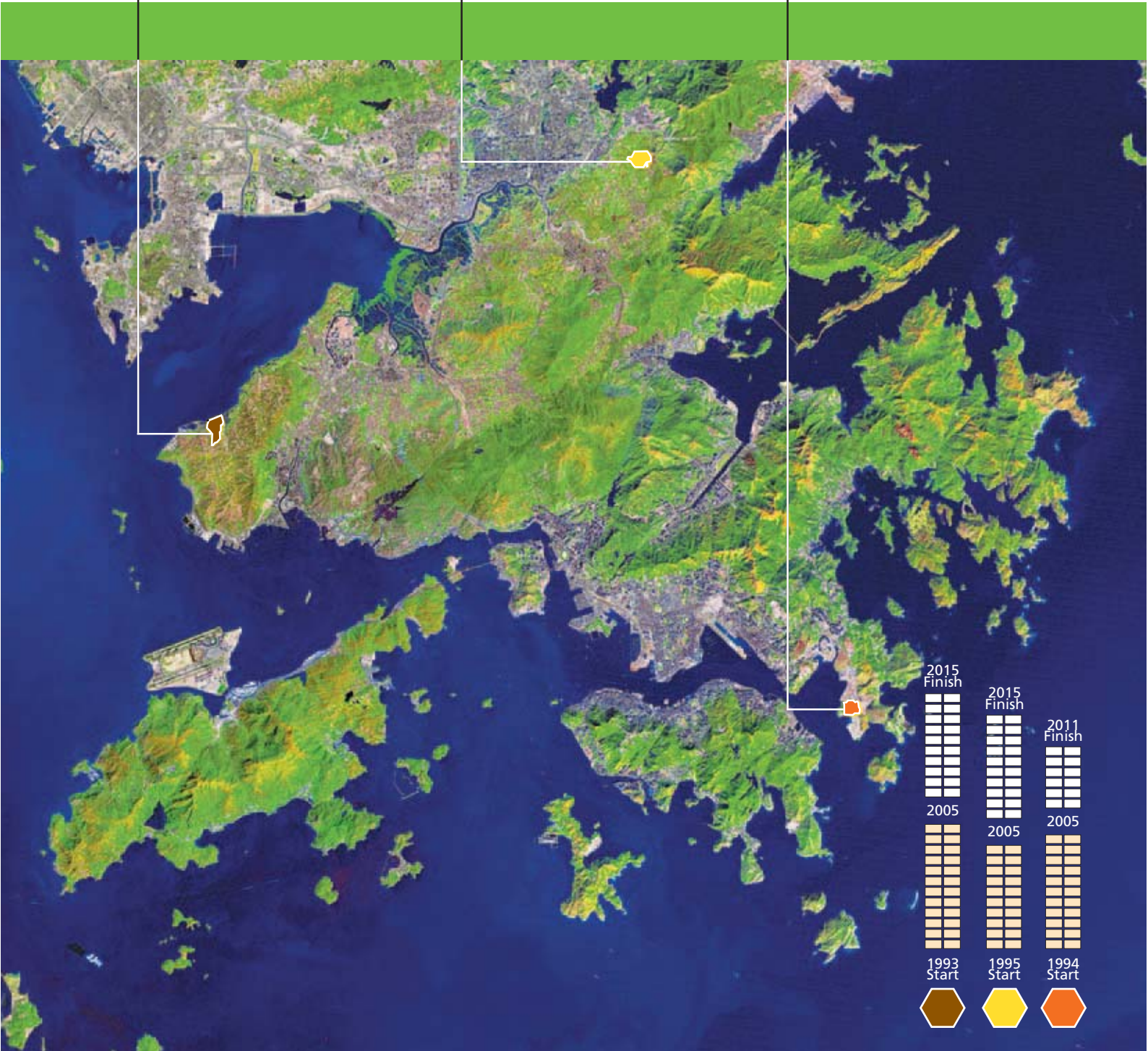
WENT Landfill



NENT Landfill



SENT Landfill



Out of sight, our landfill sites are filling up faster than anticipated



Landfills are scientifically designed and highly engineered facilities

17. Our landfills take up in total 270 ha. of land, cost \$6 billion to construct, and their running costs in 2004 amounted to \$432 million.

The annual costs of the Government's waste collection and transfer service amount to another \$435 million and \$355 million respectively. The simple truth is that if we do not reduce the growth in the amount of waste that we produce, then, given the lead time to develop a modern landfill, within the next few years we will have to identify about 400 hectares of space for new landfills to serve Hong Kong up to 2030. This is equivalent to slightly less than one-third the area of Hong Kong International Airport, or is enough land to absorb and house half of Hong Kong's population growth for the next decade.

18. The full costs of managing MSW are hidden from the community.

While calculating the annual costs of handling and disposing of Hong Kong's waste is not an exact science, reliable data exist on which reasonable estimates can be based. The figures obtained, however, are still well below the true cost to the community for such services. They do not, for instance, factor in the opportunity costs of the restored landfills and their maintenance costs, and also omit:

- The costs of removing MSW from individual housing units to refuse collection points (RCPs);
- The removal costs incurred by commercial and industrial concerns;

- The capital costs and land value of some 1,000 or so public and private RCPs; and
- The land value of the seven RTSs each occupying more than one hectare in the urban area, Shatin, Yuen Long and North Lantau, as well as several smaller RTSs on the outlying islands.

19. The greatest significance is that the costs of dealing with MSW are mostly not borne by those who produce the waste. This is because:

- Private owners, tenants and Home Ownership Scheme residents usually see the cost of waste collection in their building management fees (estimated at about \$20 to \$50 per household per month), but this represents only the first step in handling MSW.
- Commercial and industrial entities pay for the removal of their MSW. While a small number of private waste collectors use the RTSs, they contribute to only 2% of the recurrent costs of the RTSs. Most of the subsequent handling and disposal costs are paid from the public purse. Those who send their waste direct to the landfills do not pay the landfill disposal costs at all.

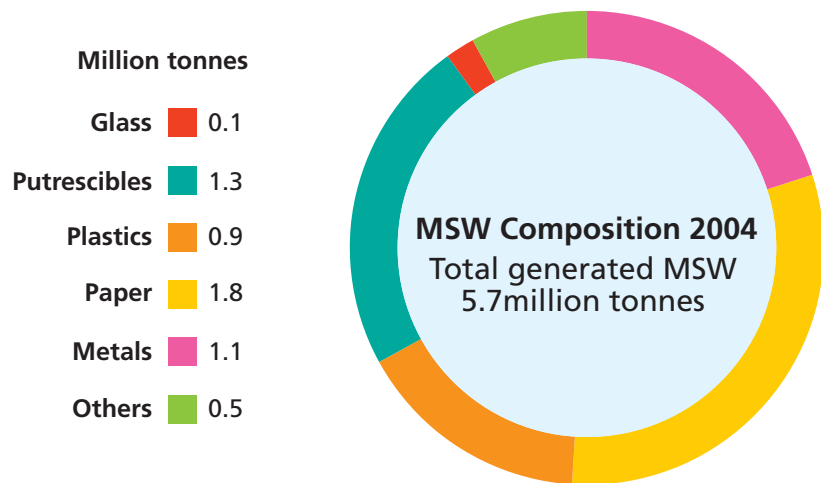
20. Most of the costs of MSW disposal are being paid for out of the public revenue and the costs appear insignificant or even non-existent for most waste producers. There are virtually no incentives for anyone to recycle or reuse waste that they produce, or to reduce the volume of material, because they are not being made to pay directly for what they are throwing away.

21. The free waste management service in Hong Kong not only provides no incentives for the general public to avoid waste, but also affects the growing costs for disposal. That MSW producers do not have to pay to dispose of their waste is not conducive to the development of the recycling industry. At the same time, all the hidden costs paid for by taxes make it hard for the general public to appreciate how cost-effectively MSW collection and management services are being run.

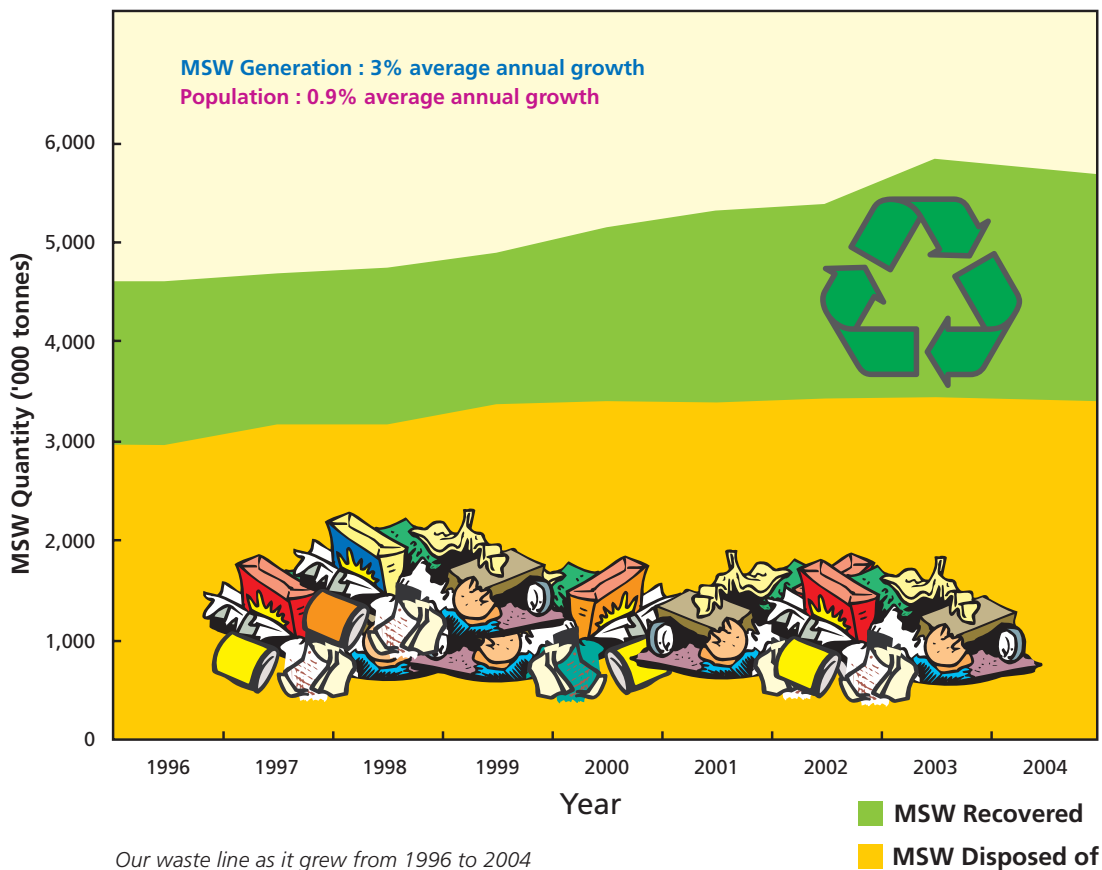
22. The stark truth is that we need to generate less waste. This will require concerted efforts of the whole community, with the guidance of firm policies. How we achieve this is the purpose of the Policy Framework.

WHERE DOES OUR WASTE COME FROM?

23. To better explain this strategy, it is necessary to first describe MSW and where it comes from. There are three sources of MSW:
- **Domestic** - this includes households and institutional premises. Waste collected from residential buildings, public litter bins, streets, marine areas and country parks also comes under this category.
 - **Commercial** - this includes shops, restaurants, hotels, offices, and markets in private housing estates. Most of this waste is collected by private waste collectors. Sometimes, commercial waste is mixed with domestic waste and is collected by the Government as a public service.
 - **Industrial** - this covers all industries, except construction and chemical activities. Industrial waste is usually collected by private contractors. Some companies may deliver their waste directly to landfills for disposal.
24. In 2004, Hong Kong produced 15,480 tonnes of MSW per day. Expressed in another way, this equates to each person generating 2.25 kg of MSW that must be recovered, recycled or, if these two options are not carried out, be disposed of every day. The following breakdown shows what was in Hong Kong's MSW in 2004:



25. Paper and plastics make up significant proportions of domestic waste, and this is a reflection of our particular lifestyle choices that place a premium on convenience and attach inappropriate and inadequate costs to the impacts of these materials.
26. Another notable factor is that about a quarter of MSW consisted of putrescibles, or primarily food waste. If poorly handled, this biodegradable waste can pose serious public health challenges. Furthermore, this kind of waste when landfilled contributes significantly to emissions of methane gas, one of the recognised causes of the greenhouse effect.
27. Adding greatly to these MSW problems and intensifying the urgency is the fact that while our population has grown an average of only 0.9% each year over the past nine years, over the same period it has generated an annual average of 3.0% more MSW. This means that each individual is producing more waste each year and increasing the burden on our scarce and precious land and our own pockets. This worrying trend is shown below.



WHAT HAS BEEN DONE SO FAR?

- 28.** There is a growing awareness that there are many sound social, environmental and economic reasons for creating less waste. By producing less waste, we ease our reliance on landfills and the need to devote more valuable and scarce land to waste. More importantly, reducing waste eases the burden on public funds and allows resources to be reallocated to ease the load on Hong Kong's other pressing needs like health care and education. Reducing MSW furthermore contributes significantly towards our broad vision for sustainable development.
- 29.** Many of these key points were captured in the WRF. The development of the WRF took stock of policy developments and technological innovations and focused on three areas that had become the cornerstone of the Government approach, namely, waste prevention, institutional arrangements and waste bulk reduction.
- **Waste prevention** - this aims at reducing the amount of waste generated at source and increasing the amount of waste material that is reused, recovered or recycled. It identifies the domestic waste stream as having the greatest scope for improvement;
 - **Institutional arrangements** - this involves setting up the institutional structures to oversee waste reduction and the legislative measures to make participation in some waste reduction measures mandatory; and
 - **Waste bulk reduction** - this aims at reducing the bulk of waste requiring final disposal and so maximises the usable life of our three landfills and reduces the amount of new land needed for waste disposal in the future.
- 30.** We have made progress in several areas. Recognising the need to champion these issues at the highest level, a Waste Sub-Committee has since been formed under the Advisory Council on the Environment (ACE), the highest standing body on Hong Kong's environmental matters, to actively debate MSW policy measures. In the Government, the merging of the Environment Branch of the Environment, Transport and Works Bureau with the Environmental Protection Department has further strengthened the resolve to tackle MSW (as well as other environmental issues) through combining the resources of the Bureau and the Department to provide a more effective institutional arrangement for overseeing waste reduction programmes.



Reaching out to the local community to encourage the public to participate in waste reduction

- 31.** Hong Kong already has a MSW recycling rate of 40% but this can be further improved upon. The Government and the community have begun to pursue various initiatives at different levels:
- The Government, together with the Environmental Campaign Committee (ECC)², has run a good number of environmental programmes for different sectors of society to change people's habits, especially regarding MSW separation at source and recycling. Outreach programmes started in the early 1990s, when environmental awareness was low and there were no large-scale recycling programmes. After a decade of venturing into the community, the situation has been reversed; most sectors of society are recycling and many are initiating their own environmental events.
 - The Government has been examining waste recovery systems to identify the most cost-effective and suitable mode. Some 28,000 three-coloured waste separation bins are now placed at some 9,300 points throughout the territory (including parks, sports venues, leisure and cultural facilities, Government buildings, hospitals, clinics, public/private housing estates, schools, RCPs and by the roadside) and altogether 663,000 tonnes of MSW have been collected for recycling through this scheme since 1998.

² The Environmental Campaign Committee (ECC) has been running since 1990 to promote public awareness of environmental issues and encourage the public to contribute actively towards a better environment. Since its establishment, the ECC has planned and organised many environmental events and activities for different sectors of the community.

- A 12-month pilot programme on source separation of domestic waste was launched in August 2004 in 13 housing estates in the Eastern District. The pilot programme aimed at making it more convenient for residents to separate domestic waste at source by encouraging and assisting property management companies to provide waste separation facilities on each floor of all buildings. The programme also aimed at expanding the types of recyclables to be collected to include all types of plastics, metals, paper, clothing and electrical products. In view of the positive results recorded under the pilot programme, a territory-wide campaign was rolled out in January 2005 to promote separation of domestic waste at source.
- The Government has been promoting the use of reusable bags to reduce the consumption of disposable plastic shopping bags. Schemes have been run by major retail chains to encourage the public to use reusable bags instead of plastic bags. The territory-wide separation of domestic waste at source scheme has also encouraged the source separation of plastic bags for recycling.
- Businesses have been partnering with green groups and the Government to recover and recycle rechargeable batteries - a first for Hong Kong in encouraging producer responsibility. With businesses providing the recovery and recycling components, the public has access to more than 1,000 collection points in shops, housing estates, public buildings, schools and other public places at which to leave their rechargeable batteries that have reached the end of their useful lives.
- Campaigns such as the "Eco-friendly packaged mooncakes" have marked success in raising the awareness of the community on the importance of avoiding excessive packaging.
- Trial schemes have been conducted to collect scrap tyres and waste electrical and electronic equipment (WEEE) including computers.
- To help the recycling industry, 29 short term tenancy (STT) sites exclusively for the recycling trade have been leased to provide affordable land resources to support recycling companies.
- Most public and some private housing buildings built after 1995 have refuse rooms on each floor which can be used to house recycling bins. Since 2000, the planning requirements have included the mandatory provision of adequate space at the ground floor for refuse storage and material recovery chambers for waste separation. However, the provision of a refuse storage or a material chamber on each floor is not yet a mandatory requirement, although an incentive is provided by way of exemption from gross floor area calculation.



a b
c d



(a) environmental education through generations, (b) recycling habits should start when young (c) collection of rechargeable batteries for recycling, and (d) old electrical equipment can be beneficially reused

- The introduction of the construction waste charges in 2005 marks a key milestone in gaining the community's acceptance of the need for the "polluter-pays" principle to reduce waste generation.
- Expressions of interest have been invited from the local and the international waste management industries for the development of large-scale waste management facilities in Hong Kong.

32. However, it has become clear that there is a need to move towards a more integrated approach. We have achieved a 40% recovery rate based on these initiatives and to realise future targets, we now need a more integrated approach to our MSW problems. As a community we must adopt a collective approach to manage our waste in a sustainable manner. We must invest now in the future.

THE GOVERNMENT ACTS : A STRATEGY FOR MSW MANAGEMENT

- 33. In the light of the seriousness and urgency of the issues, the Government recognises its responsibility for leading the community in finding the solutions.** In May 2005, the Government published A First Sustainable Development Strategy for Hong Kong (May 2005) in swift and direct response to the concerns articulated in the SDC's report on the engagement process. The speed of its response reflected its recognition of the urgency that the community at large placed on the pilot areas.
- 34.** The Government has outlined clear and socially acceptable objectives for solid waste management:

Strategic Objective 1
<ul style="list-style-type: none"> As a community, to make every effort to avoid generating waste and to reduce the amount of solid waste that needs final disposal, by adopting measures to facilitate the separation of discarded material, the recovery and reuse of material and the recycling of non-reusable material.
Strategic Objective 2
<ul style="list-style-type: none"> To apply the "user-pays principle" as a means of reducing volumes of waste for disposal.
Strategic Objective 3
<ul style="list-style-type: none"> To adopt advanced technologies and practices to treat waste requiring final disposal and to create new economic opportunities.

Table 2. The Government's strategic objectives on MSW

- 35.** In order to move towards these strategic objectives, the Government has committed to achieving the following targets:

Target 1
<ul style="list-style-type: none"> Reduce the amount of MSW generated in Hong Kong by 1% per annum up to the year 2014, based on the 2003 levels.
Target 2
<ul style="list-style-type: none"> Increase the recovery rate of MSW to 45% by 2009 and 50% by 2014.
Target 3
<ul style="list-style-type: none"> Reduce the total MSW disposed of in landfills to less than 25% by 2014.

Table 3. The 10-year targets for MSW management

SUMMARY

36. Achieving long-term sustainable development solutions in MSW management will require the entire community to work together to meet the many challenges facing Hong Kong.
37. One of the most pressing challenges is the likely exhaustion of existing landfill space within the next 6 to 10 years. With no firmly established precedent for making waste producers pay, Hong Kong sees its landfills and waste collection and transfer services as free. This has led to the next pressing challenge: we need to change our consumption-led lifestyle of casually disposing of old or surplus items, and to think of how we can avoid creating “unnecessary” waste. Hence, we each must recognise our responsibility for avoiding or reducing MSW, in reusing and recycling materials, and we must contribute to effective waste treatment. While the Government recognises its responsibility in these areas, it is essential that the wider community also plays its part.
38. **The Government can only serve the community when it has its support in first acknowledging the presence of a problem and then accepting the solution.** In MSW management, it requires the community to clearly see the real price for waste management services and to embrace the “polluter-pays” principle.

THE APPROACH - THROW LESS, PAY LESS

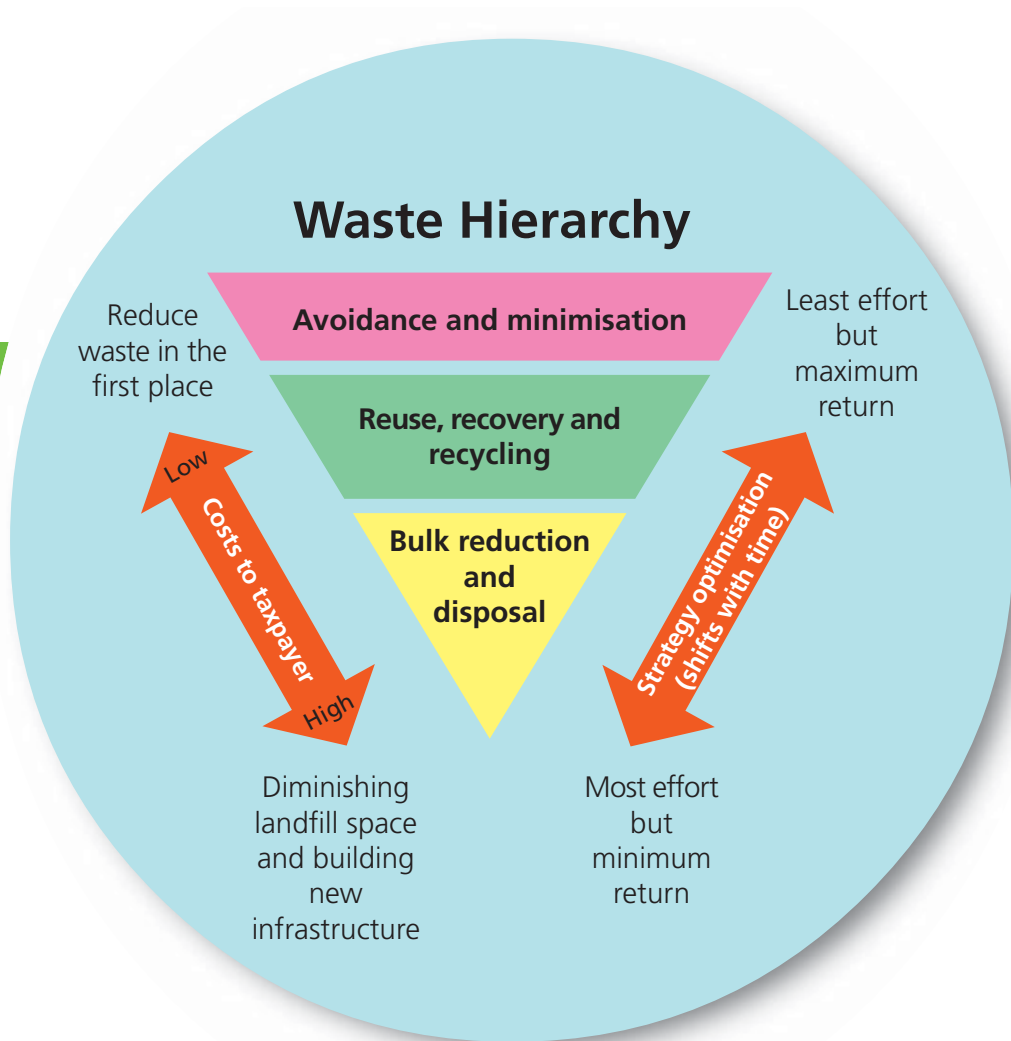
39. “Big Market, Small Government” is what Hong Kong people believe in and what the Government practises. It is only when the market fails that the Government should intervene. The ever increasing trend of MSW over the past decades is a case in point where the free market has failed, and where the true cost of our consumption-led lifestyle, particularly the significant environmental cost, is not reflected to each individual. To rectify the problem effectively, we must put the full cost back to our consumption equation, so that each individual can have the right economic incentive to choose a more sustainable way of living that involves producing less waste and recycling more. In this chapter, the Government lays out its approach to achieve sustainability in MSW management by describing the waste hierarchy and explaining how our proposed policy tools in the hierarchy can provide the incentives to induce changes in our behaviour and attitude towards waste.

THE WASTE HIERARCHY

40. The waste hierarchy is our framework for actions. The waste hierarchy has been the guiding principle for managing MSW worldwide since first introduced in 1975³. The Government’s strategy is to adopt a three-tiered approach in the waste hierarchy, which involves, in descending order of priority:

- Avoidance and minimisation;
- Reuse, recovery and recycling; and
- Bulk reduction and disposal.

³ The EU’s Waste Framework Directive of 1975 introduced the term waste hierarchy as European waste policy. In 1989, it was formalised into a hierarchy of management options in the European Commission’s Community Strategy for Waste Management and further endorsed in the Commission’s review of this strategy in 1996.



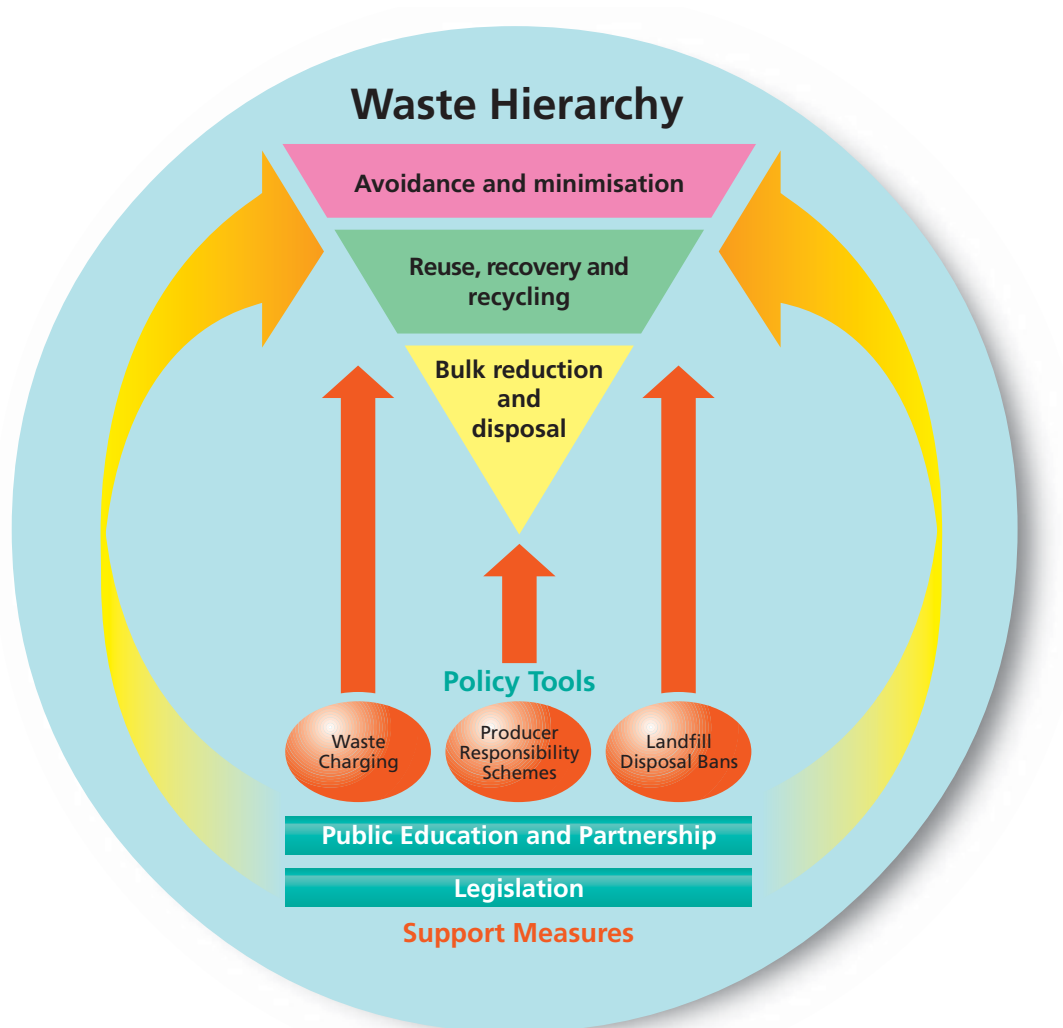
The Waste Hierarchy Model

41. **The three-tiered approach is adopted to achieve sustainable MSW management.** The first priority - avoidance and minimisation - is to address the problem at source and to encourage people to reduce waste generation as much as possible. If it is not feasible to avoid generating waste in the first place, the waste generated should be minimised as much as possible, through avenues such as appropriate product design or minimal packaging.
42. The next priority is to maximise the reuse, recovery and recycling of suitable recyclable materials. To make recycling work efficiently, robust sorting, collection and distribution systems must be in place. Equally important are the market outlets for the recycled materials. In fact, the recycling industry is a key element in a "circular economy", whereby recyclable materials generated in economic activities are returned to the consumption loop as a result of reuse, recovery and recycling. Through the loop of a "circular economy", we could achieve the most efficient use of resources and materials, while producing as little waste as possible.

- 43.** Once the possibilities of waste avoidance, minimisation and recycling have been exhausted, we must properly treat and reduce the volume of residual waste through appropriate treatment technologies. It is a commonly accepted principle that all waste should be properly treated prior to disposal at landfills to prevent long-term liabilities. The direct disposal of untreated MSW causes leachate and landfill gas (LFG) emission, and would result in long-term environmental burden.
- 44.** In economic terms, waste avoidance, reduction and recovery generate high return with relatively less investment. The Government has been working hard on these areas to achieve the most with our limited resources, and will continue to do so.
- 45. Domestic waste commands special attention.** Based on 2004 figures, each of us generates 1.35 kg of waste a day that requires disposal, out of which about 1.0 kg, or 74%, arises from the domestic source. Surveys show that only 14% of domestic waste is recovered, in sharp contrast to the recovery rate of 60% to 70% for commercial and industrial waste. This striking difference results from commercial and industrial waste being generally less diverse and less contaminated than domestic waste, thus more readily separable for recycling programmes. Also, commercial and industrial waste producers are required to pay for collecting and transporting their waste to landfills, thus having the economic incentive to reduce their waste.
- 46.** Clearly, domestic waste has the greatest potential for improvement in terms of recovery and recycling, and this is exactly where we shall devote our attention and enhance our efforts. With the very low recovery rate for domestic waste, we must take ownership of the problem, and take actions at a personal level.

THE ROLE OF POLICY TOOLS AND SUPPORT MEASURES

- 47.** Effective policy tools in the waste hierarchy are those that induce appropriate actions and achieve outcomes that further the overall objective of the Policy Framework. In MSW management, the policy tools we propose are meant to encourage waste avoidance and minimisation; waste separation and sorting; reuse and recycling; and bulk reduction and treatment. Each of our proposed policy tools works hand in hand, and aims to generate a knock-on effect that is more than the simple sum of all tools. The proposed policy tools, if implemented, will be supported by both legislation and sustained education programmes to ensure public buy-in and general compliance.



The right tools and measures for the right job

48. The proposed MSW management strategy involves:

Proposed Policy Tools	Waste charging - provides a significant effect on changing behaviour and puts in place the "polluter-pays" principle
	PRs - put the onus on the producers and users of products (i.e. the community) to share the responsibility for all the economic, social and environmental impacts of a product throughout its lifecycle
	Landfill disposal bans - divert MSW away from premium and expensive landfill space
Support Measures	Public education and Partnership - soft measures to raise awareness, increase understanding, and foster partnerships with the community and businesses
	Legislation - necessary to ensure compliance and penalise those who engage in environmentally harmful behaviour and practices.

Table 4. Proposed Policy tools and support measures

WASTE CHARGING

- 49.** MSW management is not free. There are several sound reasons for why waste charging is vital to putting in place an integrated approach to waste management. Hong Kong citizens do not pay directly for the costs of collecting, handling and disposing of the waste they generate. The annual cost of MSW management, nearly \$1.2 billion, comes out of the public purse. Therefore, there are no economic incentives for anyone to reduce the volume of waste, or to reuse or recycle waste.
- 50.** To establish a clear linkage between consumption and the environmental costs entailed, we propose to impose a direct and explicit charge on each individual for the amount of waste one discards. In other words, the full cost of managing MSW would be placed squarely on those people who generate MSW in the first place. This is fully consistent with the “polluter-pays” principle, which the public generally support. International experience has shown that where waste charges are in operation, the waste volume decreases and the rate of avoidance, as well as recycling, goes up.
- 51. Waste charging is a direct tool to change behaviour.** A consumption-led lifestyle where out-of-fashion products, whether new or used, are casually thrown away, imposes a huge burden on the waste management infrastructure and is clearly unsustainable. By imposing a direct charge on MSW, people are compelled to rethink their consumption and disposal behaviour and become more conscious about the adverse environmental consequences. They are not only in control of how much they pay for disposing of their waste by exercising a choice on purchasing, but more importantly, to play a part in reducing waste and protecting the environmental well being of Hong Kong.
- 52.** We can pay less by throwing less. Separation of waste at source is pivotal in the Government’s strategy to reduce the amount of waste requiring treatment and disposal. By imposing a direct charge on MSW, households are given an economic incentive to separate those recyclable materials from the waste stream, thus lowering the MSW charge they need to pay. Less waste being produced translates into lower long-term waste management costs and less need for landfills and other waste management facilities. The potential of environmental returns is likely to be multi-fold, and the benefits go to both the Government and the community.

PRODUCER RESPONSIBILITY

- 53. A shared responsibility shall be imposed amongst manufacturers, handlers and end-users.** Each product has economic, social and environmental impacts at different stages of its lifecycle. We must hold the producers and the users of products responsible for the products they produce and consume. The Government proposes to establish a framework for introducing PRSs for specific products, with priority given to those that have significant impacts on waste disposal, in either how they are produced, packaged, consumed or after the end of their lifespan.
- 54.** PRSs place the obligation for managing certain products on the producers, distributors or sellers of the products. A well-designed PRS spurs producers to design products that generate less waste, or that can be reused or recycled. Extended PRSs extend the concept further to a shared responsibility for all the economic, social and environmental impacts of a product throughout its lifecycle among consumers, the industries and the distributors that are involved in that product. We want not only the commercial and the industrial sectors to rethink the way they approach a product from design to disposal, but also consumers to make wise decisions on purchasing, reuse and disposal of products.
- 55. PRSs play a key role in sustaining a dynamic local recycling industry.** In a “circular economy”, waste generated as a result of economic activities is returned to the consumption loop. Recycling not only slows down the rate of depletion of natural resources, but also reduces the pollution from manufacturing activities. Over the years, we have made significant headway in recycling. As much as 2.3 million tonnes of MSW are recovered as recyclable materials annually. Yet, 90% of these materials are exported for recycling, working against the proximity principle and subjecting ourselves to volatile global demand. By establishing a long-term, stable and local source stream of recyclable products and materials through PRSs, the Government hopes to develop and sustain the local recycling industry that puts the concept of a “circular economy” in practice.

LANDFILL DISPOSAL BANS

- 56. Landfill disposal bans protect our precious landfills.** Biodegradable wastes like kitchen and restaurant waste are known to create LFG and leachate. LFG is malodorous and potentially suffocating, flammable and

explosive. Leachate is highly polluting and, if not properly controlled, may seriously contaminate water bodies through infiltration or direct discharge of leachate. The decomposition of biodegradable waste is a slow and non-homogenous process. This results in differential settlement of the landfill surface that may lead to slope instability problems for many years. In fact, the total cost of maintaining some 300 ha of closed landfill sites to address their environmental problems amounts to \$62 million per year. We must save our precious landfill capacity and reserve it for inert or unavoidable waste. A ban on biodegradable waste, proposed to be introduced in the longer term, allows landfills to last longer and makes them less of a long-term environmental burden. Such ban is also in line with overseas practices such as the EU Landfill Directive, which lays down progressively lower limits on the biodegradable content of landfilled waste.



Modern Landfills are lined to prevent contamination of ground water through infiltration of leachate

57. Landfill disposal bans have sound economic reasons. They not only ease the pressure on landfill space, but also ensure a stable and long-term source of recyclable materials for the recycling industry or the second-hand goods market. They will focus on products that can easily be separated from the main waste stream and have a recycling value or proper treatment outlets. Other than the recovery of valuable materials, the landfill disposal bans tie in with the Government's overall MSW management strategy that emphasizes waste avoidance, reduction, reuse and recycling. They complement MSW charging and PRSs to ensure that certain waste types are recovered.



Every member of the community can contribute to source separation of waste

PUBLIC EDUCATION AND PARTNERSHIP

- 58. Public education and partnership form the foundation of our policy tools.** To implement the proposed policy tools successfully, the community's full support is crucial. People must understand the need to change old practices and appreciate the advantages of our policy tools. Appeals and advertising campaigns help to raise awareness, but the greatest impacts have come through a more direct approach - by reaching out. A sustained, community-wide education and partnership programme will play a significant and long-term role in reinforcing the importance of MSW avoidance, reduction, reuse and recycling.
- 59.** We must target the young by starting at schools. A key agent of change is the education sector, where our future generations are nurtured. The development of responsible behaviour and environmentally friendly habits will hinge upon inculcating in students civic awareness and social responsibility to care about our environment through waste reduction. School curriculum plays an important role in developing responsible behaviour, which can be promoted through moral and civic education, environmental education as well as subjects such as General Studies at the primary level, Social Studies, Liberal Studies, Integrated Humanities and Science subjects etc. at the secondary level.

60. Partnerships with the business community are critical. Businesses are important partners in MSW management. The well-celebrated WasteWi\$e initiative has encouraged and recognised thousands of businesses that proactively reduce their waste. Through the participation of the business community, we can demonstrate to the wider public how our policy tools can really work, and instil the concept of sustainable MSW management in our 3.3 million strong labour force.



Partnership with the local community and green groups to promote waste reduction and recovery

LEGISLATION

61. **Legislative backing for the policy tools is needed.** The Government must be firm and fair, and legislative backing for our proposed policy tools is indispensable. Once legislation is enacted, regulatory measures will be put in place to ensure that MSW charging, PRSs and landfill disposal bans are complied with. Monitoring and enforcement will deter and penalize those environmentally harmful practices such as “fly-tipping”, and ensure that products and materials are properly recovered for reuse or recycling.

SUMMARY

- 62.** As a true believer of free market, we have proposed to put economic incentives at work through the policy tools in the three-tier waste hierarchy : avoidance and minimisation; reuse, recovery and recycling; and bulk reduction and disposal. To generate the highest return with our limited resources, the Government’s efforts focus on waste avoidance and recovery. We believe that the three major proposed policy tools - waste charging, PRSs, and landfill disposal bans - and the two key complementary measures - public education and partnership and legislation – would work hand in hand and have a knock-on effect:
- Waste charging promotes the “polluter-pays” principle and provides economic incentives to induce behavioural changes;
 - PRSs emphasize the shared responsibility and provide an added incentive to recover and recycle, thus sustaining a dynamic local recycling industry; while
 - Landfill disposal bans prevent valuable, recyclable and unstable MSW from entering landfills so as to extend their usable life, reduce long term environmental burden and complement the first two policy tools.
- 63.** To put these policy tools at work, legislation will be introduced. The Government will also reinforce the key message of waste reduction and recycling through public education and partnership.

CHAPTER 4

TACKLING THE PROBLEM - THE STRATEGY

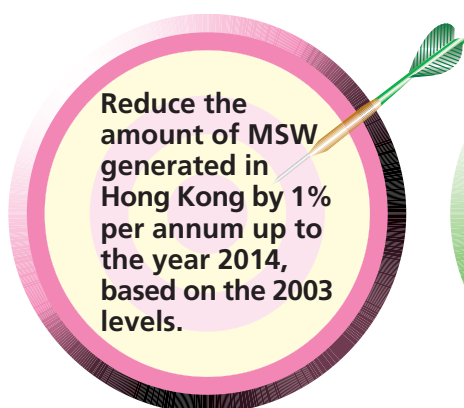
- 64. We must translate the proposed waste management strategy into action.** All the best strategies in the world cannot achieve the desired results unless the implementation is decisive and timely. Therefore, the public needs to know how the strategy and policy tools relate to them, and under what timeframe these will come into force. This chapter explains how the measures will be executed in relation to our three major targets.

OUR TARGETS

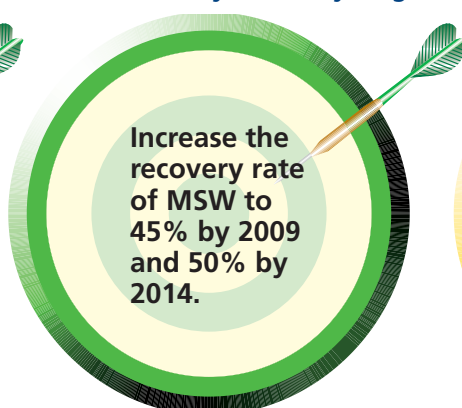
- 65.** This is a good time to remind ourselves of the main waste management targets for the coming decade, particularly how they relate to the waste hierarchy approach described in the previous chapter and how the policy tools and support measures are to be applied:

Targets

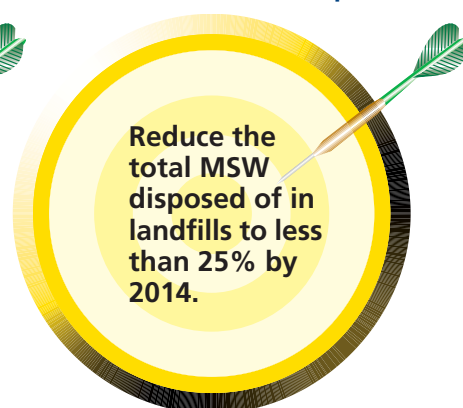
Avoidance and Minimisation



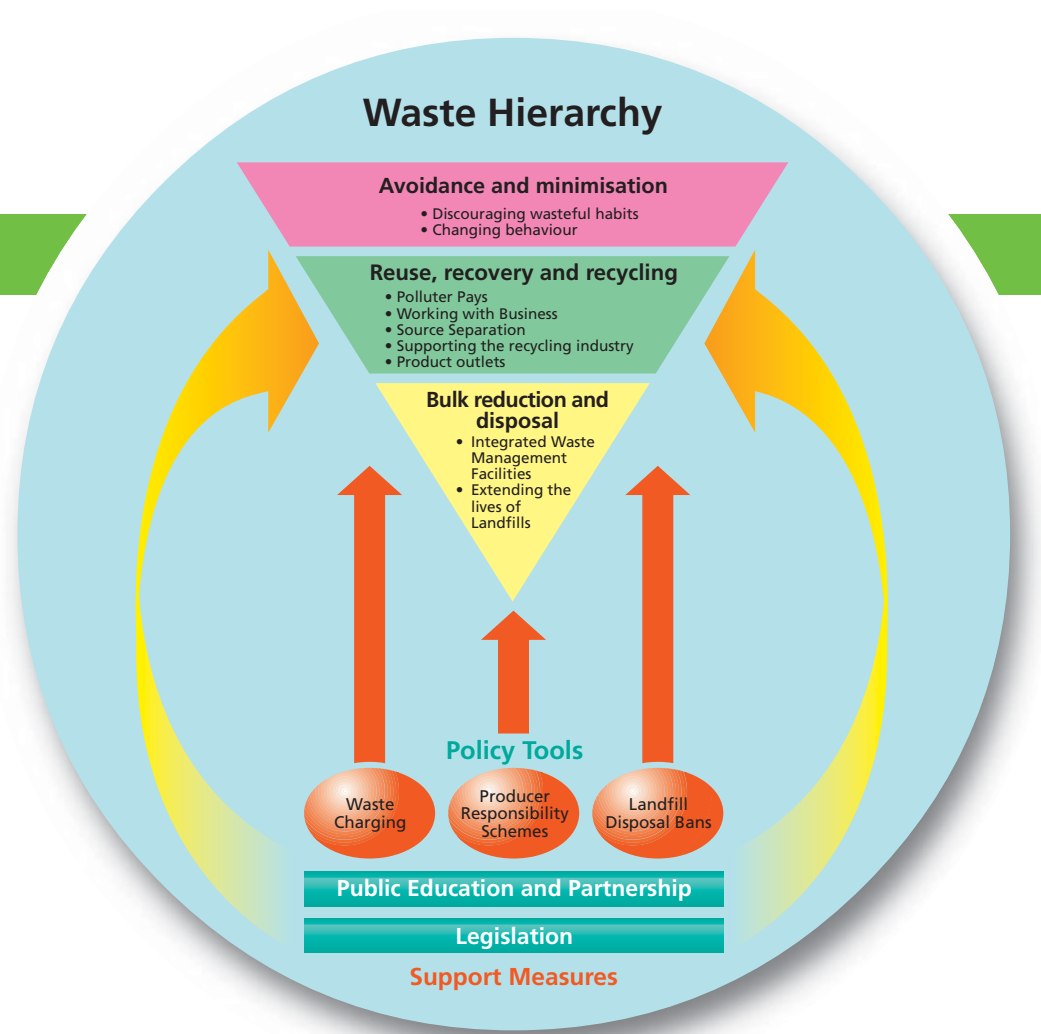
Reuse, Recovery and Recycling



Bulk Reduction and Disposal



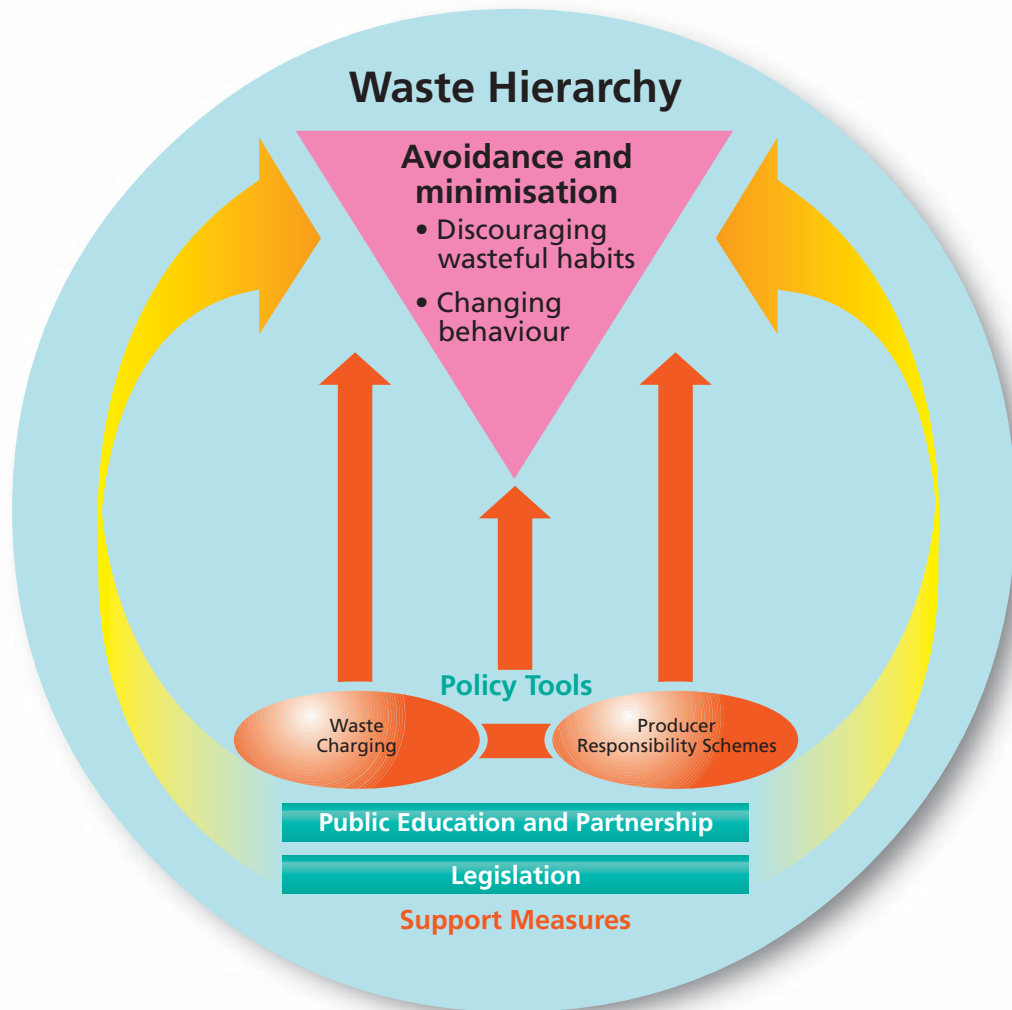
- 66.** These targets are tangible reductions in MSW and tell us exactly where we need to focus our efforts. With the proposed policy tools and the concerted efforts of our entire community, we are confident that these laudable targets are achievable.



Well sign-posted, Hong Kong's MSW Strategy

THE STRATEGY

67. The Government's strategy is based on the three target areas of avoidance and minimisation; reuse, recovery and recycling; and bulk reduction and disposal. Within each target area is a series of proposed initiatives, each a goal in itself that in turn contributes to the achievement of the main target.
68. The driving force of the strategy comes from the policy tools of waste charging, PRSs and landfill disposal bans. These are supported by public education and partnership, and legislation.



The Waste hierarchy starts with avoidance and minimisation

WASTE AVOIDANCE AND MINIMISATION

- 69. Discouraging wasteful habits is the first step.** Waste charging is the key policy tool in waste avoidance and minimisation. By putting a price on generating waste, we can induce change in people's wasteful habits and behaviour.
- 70.** What is a suitable means of imposing waste charges? While there are several methods of doing so, we consider a variable charge by the amount of waste more appropriate for Hong Kong. The charge will be imposed only on mixed waste, which is the remainder after reusable and recyclable materials are taken out. A variable charging system can encourage both the reduction of MSW and the recycling of useful materials whereas a flat fee can induce

neither. Such a fee is also in line with the principles set out by the SDC and the views expressed by stakeholders⁴ on MSW management.

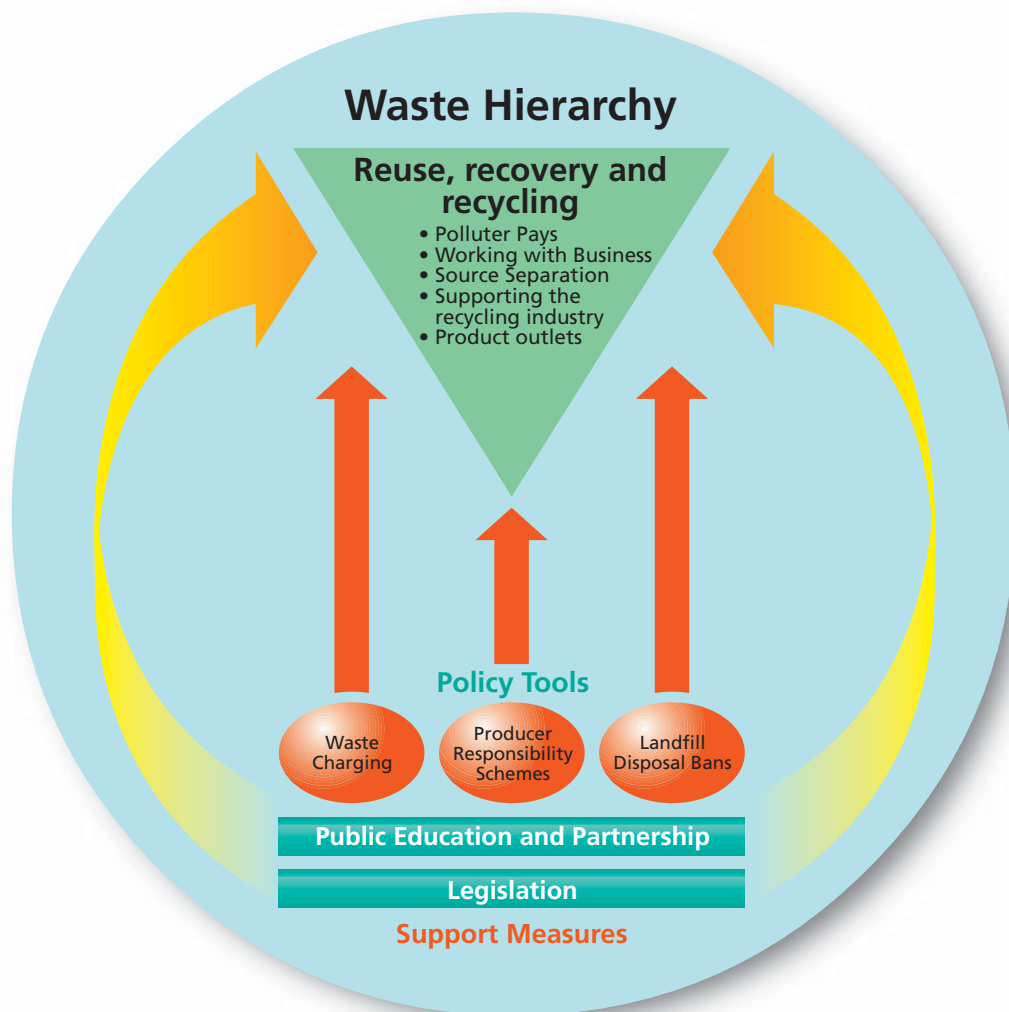
- 71.** An MSW charging system of a variable rate can operate in different modes such as weight-based, frequency-based or volume-based. Volume-based systems that involve bags, bins or stickers are gaining popularity overseas and can serve as a good reference for Hong Kong. The detailed design of a variable-rate system will of course need to take into account Hong Kong's unique characteristics and the multi-occupant high rise living environment. A method being considered, amongst others, is to use pre-paid waste disposal bags.
- 72.** Pre-paid waste disposal bags will come in different sizes. The prices of the bags should be set at a rate high enough to recover the cost of treatment and encourage a change in behaviour. These pre-paid bags will be the only ones accepted by waste collectors. As a major initiative that has territory-wide implications, the public will be fully consulted on the specific proposal we draw up. Subject to public consultation, legislation specifying how MSW will be charged and suitable sanctions on non-compliance will be introduced into the Legislative Council. To allow sufficient time for the public to build consensus, we envisage that the MSW Charging Bill can be introduced in 2007.
- 73.** Waste avoidance is achieved in specific waste types through PRSs and other measures. Working in partnership with businesses enables the Government to establish the conditions for waste avoidance through re-designing products or reducing excessive consumption where possible. Some examples are listed below:
 - **Plastic bags** - Plastic bags are non-biodegradable and their excessive consumption burdens our landfills and wastes resources that can have alternative uses. About 1,000 tonnes of plastic bags end up in landfills each day, accounting for 11% of MSW disposed of in Hong Kong. We encourage the separation of plastic bags for recycling through the territory-wide separation of domestic waste at source programme. Schemes have been run by major retail chains to encourage the public to use reusable bags instead of plastic shopping bags. Through a PRS-based charge that will be administered by retailers, the Government aims to drastically cut back the number of bags used.

⁴ Council for Sustainable Development, *Making Choices for Our Future: Report on the Engagement Process for a First Sustainable Development Strategy*, (February 2005).

- **Expanded-polystyrene lunchboxes** - Expanded-polystyrene boxes form a highly visible component of Hong Kong's waste. In collaboration with green groups, the Government has organized a series of forums starting with primary and secondary schools to use fewer disposable lunchboxes. Addressing the issue through schools is perhaps one of the best ways to reduce solid waste.
- **Packaging** - The Government will encourage producers to reduce packaging where it is not necessary. Campaigns such as the 'Eco-friendly packaged mooncakes' and the 'Mooncake tin can recovery' have marked success in raising community awareness of the importance of avoiding excessive packaging. PRS levies will be introduced subject to consultation with the trade.

REUSE, RECOVERY AND RECYCLING

- 74.** As individuals take responsibility for their waste by reusing, recovering or recycling it, they will be contributing to both the targets of this strategy and a sustainable Hong Kong in the long term. The charge on MSW will provide an economic incentive for households and businesses to separate recyclable materials from the waste stream. PRSs will further support the materials to be recycled.
- 75. How do PRSs work in practice?** PRSs assign responsibilities to appropriate parties to collect, recycle and properly dispose of used products that do not have a ready market. A typical PRS will involve some of the following elements:
- imposing take-back responsibility for recovering and recycling end-of-life products;
 - restricting free distribution of certain types of products to reduce consumption;
 - imposing a mandatory deposit system for certain types of products to facilitate recovery;
 - imposing a levy or fee for recovering and recycling certain types of end-of-life products; or
 - imposing restrictions on some components in certain products to facilitate recycling.



The three Rs (reuse, recovery and recycling) provide the central grounding in MSW

- 76.** Hong Kong already has some PRS experience. There are pilot schemes underway to determine the viability of recovering materials from several products, so producers can take on the responsibility for recycling. These schemes are for electrical and electronic equipment, vehicle tyres, rechargeable batteries, packaging materials and beverage containers. A pilot centre will be set up at the Kowloon Bay Transfer Station by 2006 to gain more experience on the PRSs for electrical and electronic equipment.
- 77.** Based on the results of these schemes, the Government intends to introduce mandatory PRSs on specific products that require particular attention. Given the diverse nature of different products and the materials that are involved, each will require a custom-designed scheme. Each scheme will also need to have a collection and recycling component. For example, in the pilot PRS for

rechargeable batteries, participating battery producers and importers have made contributions to an operating fund. The trade manages the fund and operates a scheme to recover used batteries for recycling. The Government will explore various options for implementing the mandatory PRSs.

- 78.** Working with business is a key element in the success of PRSs and ultimately in the success of achieving the waste reduction targets. By virtue of its central role in our free market economy, business cannot help but be involved in every aspect of a product's life - from cradle to grave, or more appropriately, from the designer's mind to the end of a product's intended use.
- 79. Consumers as decision-makers deciding which products to use must play their part as well.** Businesses are best placed to design a PRS which best suits their needs and encourages consumers to change their behaviour, recycle more, and more importantly, to provide a steady source of materials for the recycling industry.
- 80.** With the imposition of MSW charges, consumers will be further encouraged to "think waste". Given the choice between two products, one with more recycling opportunities or encased in less packaging than the other, it should be easy for the consumers to make a right choice. This illustrates how decisions made at one end of a product's life cycle can have an effect at the other.
- 81.** Legislation will be introduced into the Legislative Council in 2006 to provide the framework for PRSs, with product-specific measures introduced through subsidiary legislation subsequently. As Hong Kong is no longer a major manufacturing base, PRSs in Hong Kong will emphasize the shared responsibility of all parties along the supply chain, from importers and distributors to retailers and consumers. The framework legislation, now named the Product Eco-responsibility Bill (PER Bill), will authorise the Director of Environmental Protection (DEP) as the enforcement authority to ensure compliance with the product-specific regulations.

- 82.** The regulatory measures will consider who are the main responsible parties in the supply chain, so that the PRSs will be able to work effectively to achieve targets for waste avoidance and minimisation as well as reuse, recovery and recycling.







Products	Target Date
 Electrical and Electronic Equipment (EEE)	2007
 Vehicle tyres	2007
 Plastic shopping bags	2007
 Packaging materials	2008
 Beverage containers	2008
 Rechargeable batteries	2009

Table 5. PRS - Implementation programme for some of the products

- 83.** The PRS initiatives will need to be supported by a network of regional and district recycling centres. These centres will provide temporary sites for the end-of-life products separated from the main waste stream before they are taken to recycling plants or other treatment outlets. The centres are also expected to make collecting separated MSW more efficient. The Government is also exploring the setting up of public spaces dedicated to recycling activities such as idle corners of land below flyovers.
- 84.** We may impose landfill disposal bans on certain end-of-life products. Consumers or commercial users will be required to separate from their main MSW streams the banned materials or products, for example vehicle tyres and bulky electrical appliances, and prepare them for proper recycling or treatment outlets. In this way, the flow of recyclable materials from commercial and industrial operations to the waste recycling industry can be further strengthened. Landfill disposal bans will come into effect after the concerned PRS is introduced.



Waste separation facilities can be provided on each floor of the building

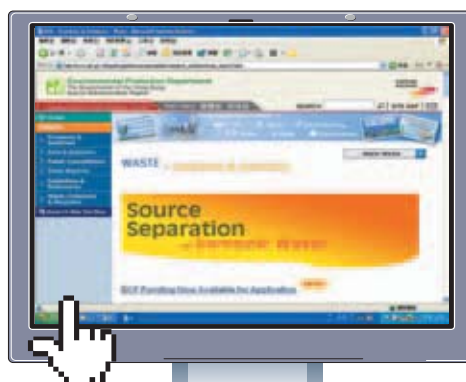
SOURCE SEPARATION OF WASTE - STARTING THE PROCESS

- 85. The success of reuse, recovery and recycling depends on the sorting of waste at source.** There is a distinction between 'clean' sorted waste (like paper, plastics, and metals) and 'dirty' waste (contaminated materials, such as food packaging, used tissues and soiled diapers). Dirty waste is commonly known as mixed waste and has little recycling value. On the other hand, clean sorted waste holds high value for the recycling industry.
- 86.** Source separation can be achieved in Hong Kong by encouraging and assisting property management companies to provide waste separation facilities on each building floor, where feasible, and broadening the range of recyclables to be recovered. Initial results of a pilot scheme run at the Eastern District housing estates to facilitate the separation of domestic waste by residents at source were encouraging. Some of the 13 estates more than doubled the quantity of recovered recyclables by actively encouraging the participation of the community across all ages.

- 87.** The Government is partnering with various parties to expand this programme territory-wide and to focus on domestic waste. The property management sector is a key partner in managing MSW from buildings and housing estates. The Government will conduct outreach programmes for large property management companies and housing estates and schools in collaboration with bodies like the Hong Kong Association of Property Management Companies Limited and the Property Management Partnership Liaison Group. The Government will continue to organise seminars and visits for property managers to learn about environmental management. The scheme will certainly help implement green practices, including separation of domestic waste at source in buildings and housing estates. Property management companies acting on behalf of the residents' organizations of the private housing estates and residential buildings can apply for funding from the Environment and Conservation Fund (ECF) to partially subsidize the set-up cost of waste separation facilities/equipment on each floor of the building. The Housing Department has also been implementing source separation at the public rental housing (PRH) estates.
- 88.** Our aim is to invite all households to separate waste at source. Our targets are:
- to increase the domestic waste recovery rate from 14% in 2004 to 20% in 2007 and 26% in 2012. The aim is for housing estates to achieve a 50% increase in recovered quantities after the first year of implementation;
 - to have 80% of the population in Hong Kong taking part by 2010. The aim is to gradually increase the number of estates under the programme to 180, 700, 1,140 and 1,360 by the end of 2005, 2007, 2009 and 2010 respectively; and
 - to gradually increase the number of PRH estates under the programme from 30 PRH estates in 2005 to all PRH estates by 2012.
- 89.** Publicity and education are important to support waste sorting and separation. In parallel with the introduction of separation facilities in housing estates, we will conduct territory-wide campaigns to educate residents on waste separation. For instance, a territory-wide publicity and education programme to be jointly launched by the ECC and the Government will emphasize the need and

importance of source separation of domestic waste. The campaign will be promoted through publicity such as posters and labels distributed to housing estates and announcements on the electronic media.

- 90.** A website dedicated to source separation has been set up and competitions among housing estates will be organised to give the estates and property management companies incentives to participate and provide regular recovery data. A comprehensive guidebook provides technical advice on how best to separate and where to place the separated materials on residential floors, together with explanations on the buildings and fire safety-related ordinances.



<http://www.epd.gov.hk/epd/english/environmentinhk/waste>

- 91.** A recycling programme that provides recycling bins has also been running in schools since 2000 to enhance students' understanding of the importance of conserving resources and separating waste. The increase in the volume of recyclables collected over the years proves the success of the programme in turning students' awareness into action.
- 92.** Each participating estate can have the flexibility to adopt the best mode of waste separation and recovery to suit its particular constraints. For example, for buildings with enough space, MSW separation facilities for different recyclables will be put in refuse rooms or other designated waste collection locations on each floor. In buildings without adequate space, mixed recyclables will be collected in designated containers or areas. Some estates may encourage residents to take out recyclables separately on specified days of the week. In this way, recyclables can be separated within each estate and sold direct to recyclers. Management companies or cleansing contractors will be able to pass on to residents the benefits of the extra revenue.
- 93.** The Building (Refuse Storage and Material Recovery Chambers and Refuse Chutes) Regulations require new buildings to provide a material recovery chamber on the ground floor of each building. In view of the possible problems encountered in implementing the source separation programme due to the lack

of space on each floor of buildings, consideration will be given to introducing legislative amendments to include a mandatory requirement to provide a refuse storage and material recovery room on each floor of new residential buildings to facilitate material recovery activities.

SUPPORTING THE RECYCLING INDUSTRY - the "CIRCULAR ECONOMY"

- 94.** The "circular economy" provides a sustainable solution to the waste problems. In a "circular economy", as much as possible of the waste generated as a result of economic activities is returned to the consumption loop. Reuse, recovery and recycling, as integral elements in the waste hierarchy, encourage repeated uses of resources or materials.
- 95. Waste recycling is a key element in our MSW strategy.** The Government's intention is to promote the local recycling industry and jump-start a "circular economy". The Government has been formulating a comprehensive policy to support the recycling industry. This includes allocating suitable land resources, encouraging research and development, introducing environmental legislation and providing effective support measures. The Government will:
- improve the collection network through programmes on separation of waste at source;
 - adopt PRSs as a major measure to enhance the recovery of recyclable materials;
 - lease suitable STT sites exclusively to waste recyclers;
 - establish an EcoPark to provide long-term land for the environmental and recycling business;
 - adopt a green procurement policy to enhance market demand for recycled products;
 - continue to support and encourage research and development of new recycling technologies through the ECF, the Innovation and Technology Fund, and funds for small and medium enterprises; and
 - continue to organise educational programmes at the community level to increase the public awareness of waste recycling.



Tomorrow's "circular economy" as it emerges from today's planners

- 96.** The EcoPark will act as a valuable resource for the development of advanced, value-added environmental industries. The Government has pledged to build a 20-hectare EcoPark in Tuen Mun Area 38 with a marine frontage of over 450 m. The EcoPark will provide long-term land for both the recycling and the environmental industries with a view to encouraging investment in advanced and cost-effective technologies. The Government will fund the construction cost of infrastructure so that an affordable rent can be offered to the waste recycling and environmental industries. Priority will be given to those industries which can help to achieve the Government's MSW management objectives. Phase I of the EcoPark will be available for occupation by the end of 2006.
- 97.** A green procurement policy facilitates the development of a "circular economy". Recycling cannot be sustained without market outlets for recycled products. The Government is therefore taking the lead to adopt a green procurement policy and is regularly reviewing the specifications for bulk purchase items so as to incorporate environmentally friendly features where practicable. For example, the Government is taking the lead to encourage the use of recycled aggregate and geo-construction materials made of waste rubber tyres in its construction works. The Government will also encourage local corporations to give priority to green products when deciding on what to buy.

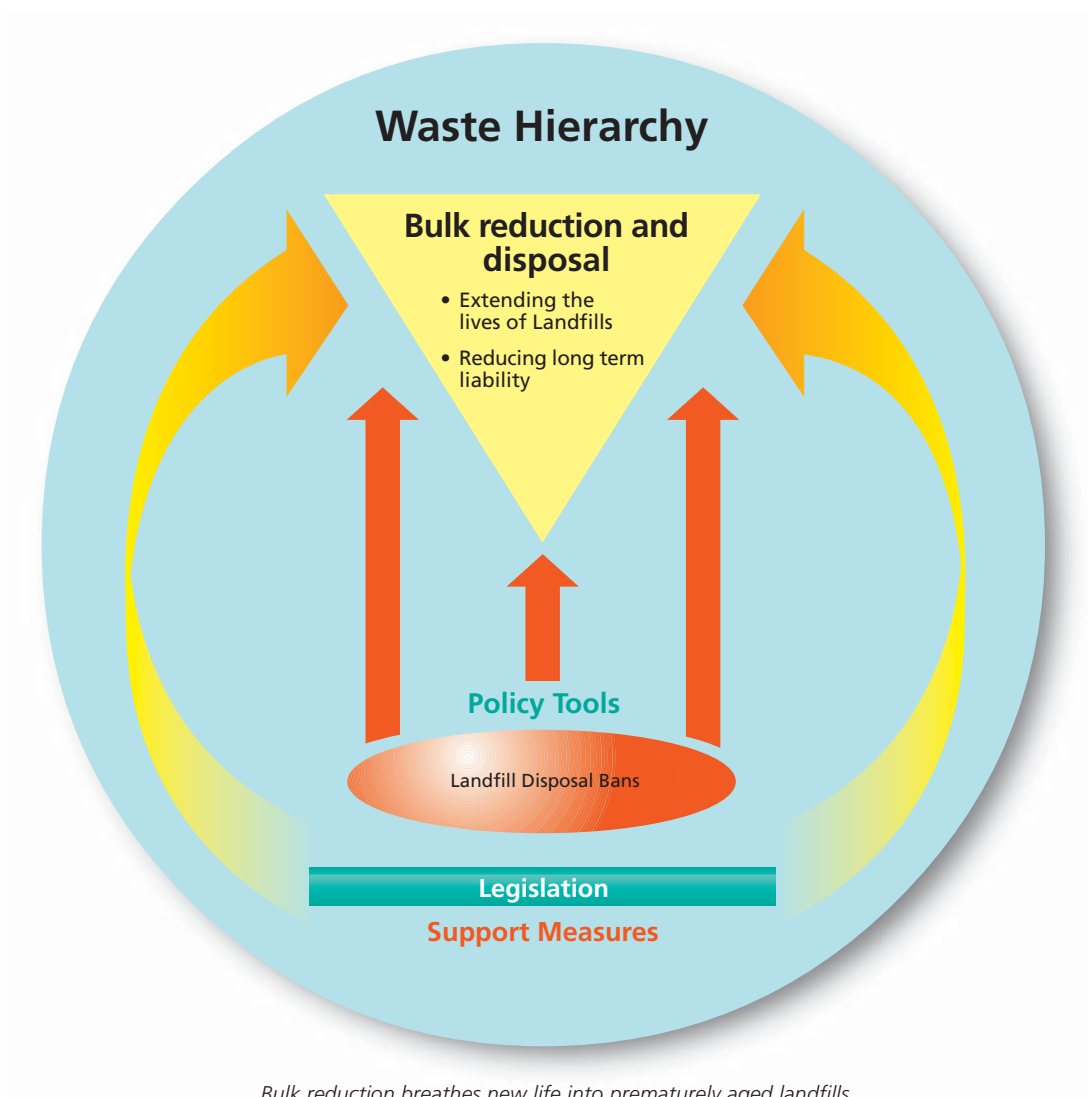
CHANGING ATTITUDES THROUGH EDUCATION

- 98.** A key driver to waste avoidance and minimisation is public education and partnership. Environmental education plays an important role in inducing behavioural change and gaining public support. Publicity and education on waste avoidance and reduction, as well as separation and recycling, are to be stepped up to reflect the high priority of MSW management in public policy.
- 99.** Building on our well-established foundation in public education and engagement, a territory-wide publicity and education campaign will be jointly launched by the ECC and the Government in late 2005 to spread the waste management message to the public. A series of activities and education programmes intended for people from all walks of life will place emphasis on turning awareness into real action and empowering them to be agents of change in achieving a more sustainable lifestyle.
- 100.** The most effective environmental campaigns reach people's daily lives and enable them to be responsible for protecting the environment. It is also essential to help the community build capacity so that it can sustain its participation. With this in mind, the Government will:
- provide more extensive outreach services through the Mobile Environmental Resource Centre, Green Desk and roving exhibitions at public places like shopping malls and housing estates to answer enquiries from the public;
 - continue to mobilise local community groups to organise environmental activities at the district level to raise awareness of and harness public participation in MSW management; and
 - encourage community groups to integrate environmental elements into their community programmes.
- 101.** We believe that by partnering community groups, substantial progress can be made to change people's behaviour and obtain the public's support for our key policy initiatives on MSW management.

- 102.** Activities for students will be developed to complement the curriculum on MSW management. Some examples of our school education activities include the School Environmental Award Scheme cum Student Environmental Protection Ambassador Scheme (SEAS cum SEPAS), the Hong Kong Green Pre-School and Green School Award (HKGSA), and other education programmes:
- In 2004, the ECC signed up some 12 000 Student Environmental Protection Ambassadors from 750 schools. Students are trained to be green leaders through the SEAS cum SEPAS, which help to organise green activities on campus. Under the 'Waste avoidance and reduction' theme, ambassadors from primary and secondary schools are being trained to promote waste avoidance and reduction at schools during 2005-06;
 - The HKGSA encourages pre-schools and schools to draw up comprehensive environmental management plans and promote green practices, including waste reduction among staff and students on and off campus; and
 - The Government will continue to conduct other education programmes on waste reduction and recovery as an on-going effort, including interactive workshops and student visits to waste management facilities such as landfills. These programmes will be designed to help students to better understand the waste issues and mobilise their participation in waste reduction and recycling activities.
- 103.** To make the school curriculum work, the Government is assisting teachers by producing ready-made teaching materials on topics relating to waste reduction and recovery. Some of these materials are linked to the Hong Kong secondary school syllabus. Separate education kits have also been produced for primary schools and pre-schools.

BULK REDUCTION AND DISPOSAL

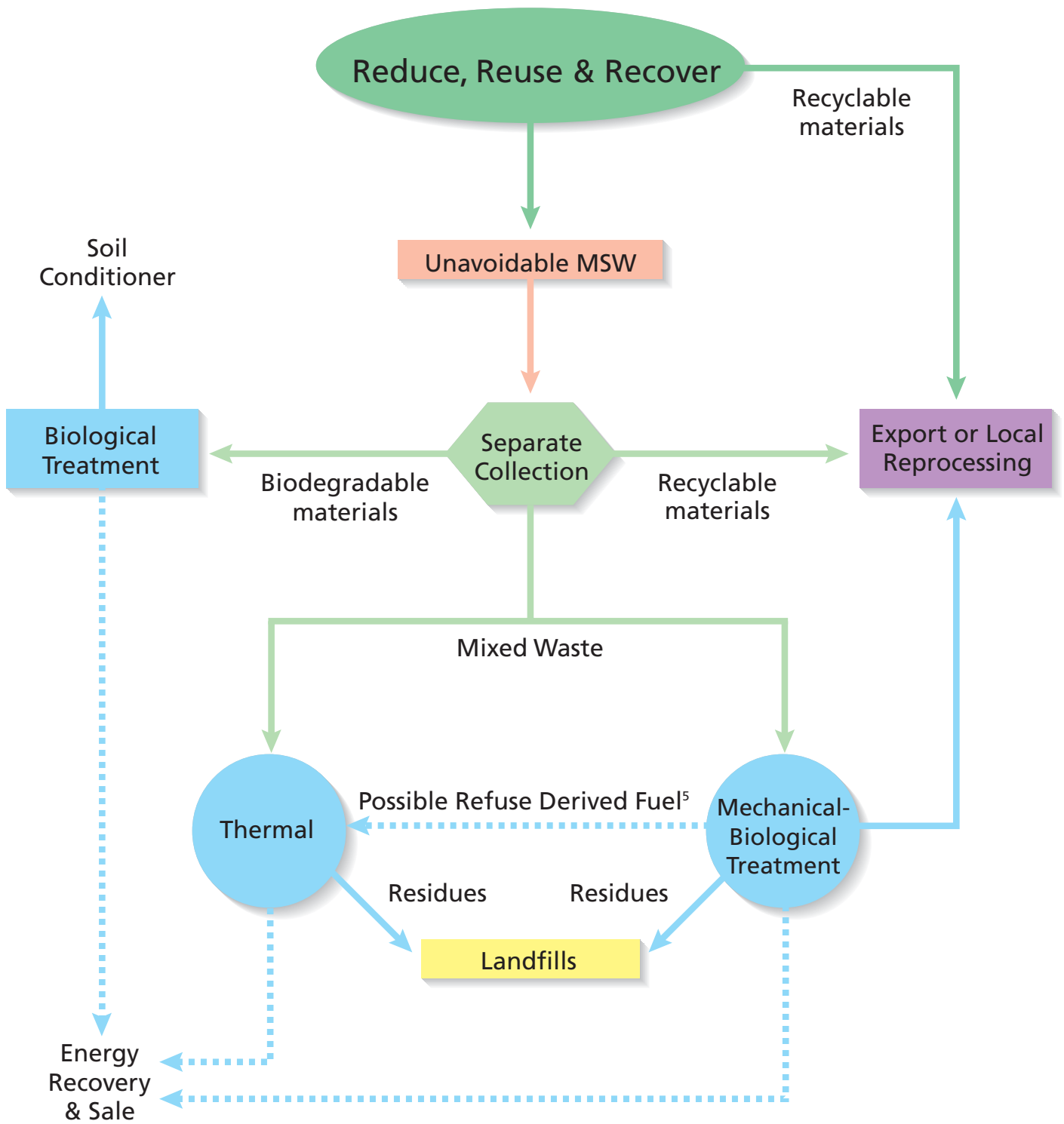
- 104. A landfill disposal ban on biodegradable MSW will facilitate a sustainable waste management strategy.** Solely relying on landfills for waste disposal is clearly not sustainable. Our existing landfills are running out of capacity, and we face increasing difficulty in identifying suitable sites for new landfills. They cost \$6 billion to construct, \$432 million to operate in 2004 and



another \$1.2 billion to maintain after their closure. We must conserve the landfill capacity only for the disposal of unavoidable and treated waste.

105. Landfill disposal bans are employed overseas to divert biodegradable waste from landfills, which help to prolong their lives and reduce the long-term liability of leachate and LFG generated from the landfills. In Hong Kong’s case, as appropriate technologies such as composting or anaerobic digestion come on line, landfill disposal bans will, in the longer term, be extended to cover biodegradable waste, such as food waste.

106. We still need treatment technologies to further reduce the volume of waste before final disposal. Several technologies are being considered. These were selected from submissions made by local and overseas companies



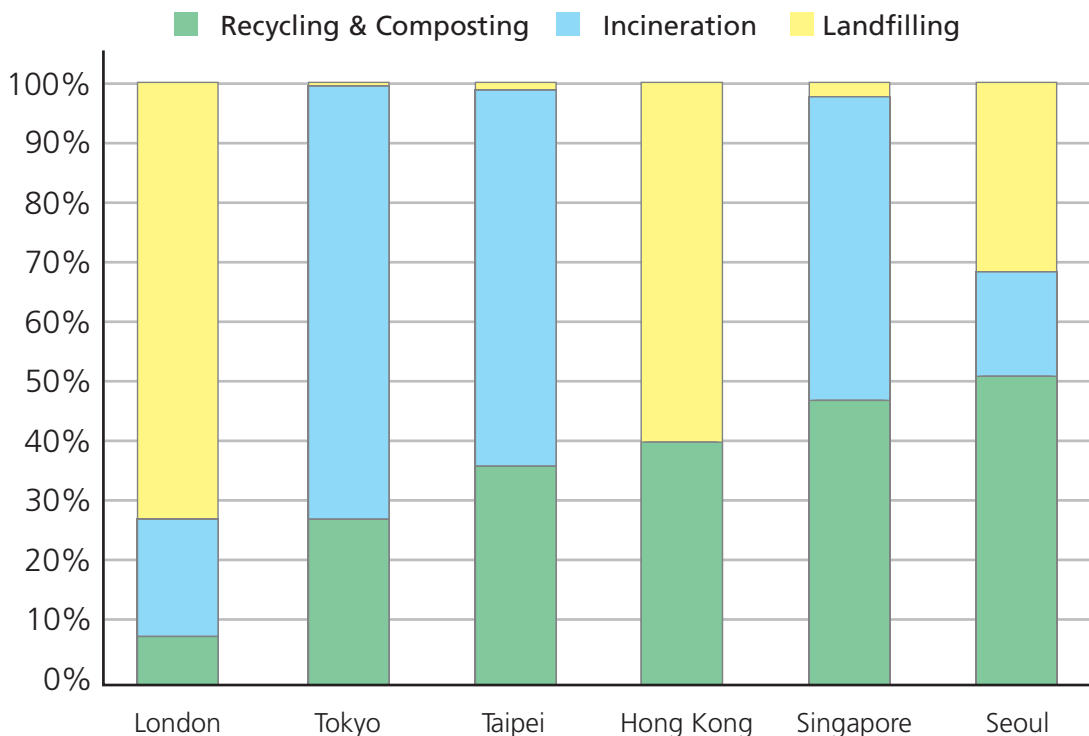
The Integrated Waste Management Facilities show the way

⁵ Some mechanical-biological treatment (MBT) plants process the non-recyclable materials into refuse-derived-fuel (RDF). RDF consists of the combustible materials in MSW, for example paper and plastic, which are separated from the non-combustible fraction of mixed MSW. They are then shredded and pelletized to facilitate handling, transportation and storage. Based on overseas experience, the potential outlets of RDF (mainly power plants, paper mills, steel plants, cement plants) are severely limited, and this equally applies to Hong Kong.

that were invited in 2002 to propose waste treatment technologies for the Integrated Waste Management Facilities (IWMF). An Advisory Group on Waste Management Facilities (AG), made up of non-officials, including academics and professionals, has been set up to assist and advise the Government in selecting the most appropriate technologies based on environmental, technological, social, economical as well as consumer considerations.

- 107.** The AG has recommended a multi-technology approach so that the most suitable technology may be applied to deal with different waste streams of the mixed unavoidable waste. The approach builds on existing efforts to promote waste reduction and recovery.
- 108.** Through MSW separation at source, recyclable materials will be recovered for recycling. Biodegradable materials such as food waste from commercial and industrial establishments can be separately collected at source for biological treatment such as composting and anaerobic digestion. Composting requires stringent control on the composting conditions and on the emissions to reduce odour problem. The volume of biodegradable waste which could be treated by biological methods also depends on the available outlets for the by-products, which are very limited in Hong Kong since we do not have much agricultural activities, and exporting compost to the Mainland is not practicable due to the strict import control on the quality of compost produced from MSW. We estimate that Hong Kong is able to take up soil conditioners produced from about 500 tonnes of biodegradable waste per day.
- 109.** The remaining mixed MSW will then be treated by mechanical-biological treatment (MBT) and incineration. The MBT process mainly recovers recyclable materials and a biodegradable fraction from mixed waste. A series of mechanical operations take out recyclable materials such as metals and glass. The biodegradable fraction is treated and stabilised by a biological process such as composting or anaerobic digestion before being applied to land. While it can only reduce the waste volume by about 50%, MBT requires 2-3 times more land than other technologies. Experience in Europe suggests that 50 - 60% of the residues will still need to be disposed of at landfills if MBT technology alone is adopted. Hence, MBT cannot be the sole method used in Hong Kong to treat mixed MSW.

- 110.** The portion of the mixed waste not treated by MBT will be incinerated. Incineration is a technologically well-proven method adopted by many advanced countries in Europe and Asia. Through incineration, waste is combusted to reduce its volume and hazardous properties. Either heat or electricity can be generated in the process. Modern incinerators adopt advanced process control measures to optimise the combustion process. Such measures include controlled burning at temperatures typically over 850°C, long residence time and high turbulence to ensure complete combustion of MSW to destroy all organic pollutants and prevent the production of new pollutants.
- 111.** Incinerators can meet the most stringent international emission standards by using advanced gas-cleaning and pollution abatement equipment such as fabric filters, scrubbers and activated carbon-powder injection systems. Incineration is considered the most cost-effective technology of the options being considered to divert waste from the landfills. Furthermore, incinerators need far less land than biological treatment options.



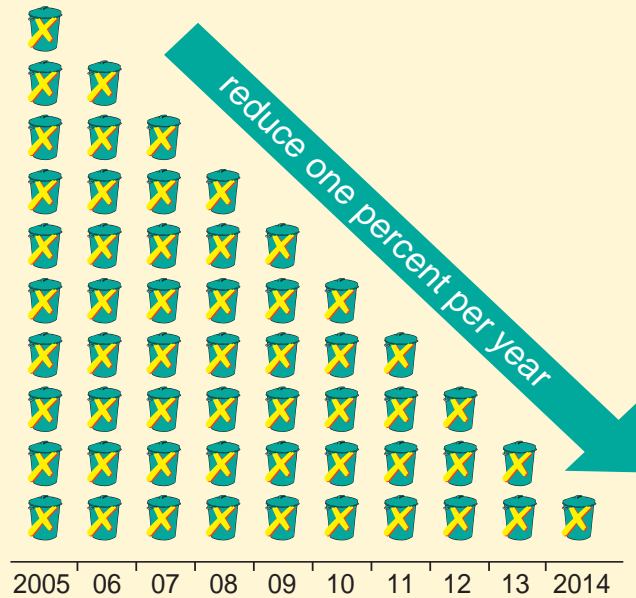
How Hong Kong and other cities manage their MSW

- 112.** While it is estimated that Hong Kong may be able to support an MBT plant up to the capacity of 1,000 tonnes of waste per day, the remaining 5,700 tonnes will be treated by incineration. The limitations over the capacity of MBT would be its land requirement, cost-effectiveness and availability of outlets for its products. This capacity will also have a knock-on effect over the required capacity of the incinerator. The exact mix of these capacities will be subject to further in-depth studies. After the various measures on avoidance, reuse and recycling are introduced, the IWMF will be established in two phases. The phased approach will allow us to put in place a suitably sized plant in the first phase to achieve bulk reduction, hence extending the lives of the landfills. Depending on progress of the waste reduction measures and the effectiveness in reducing the volume of unavoidable waste, we can confirm the need and the size of the remaining components of the IWMF before they are built and commissioned in the second phase. We aim to commission the IWMF in mid 2010s subject to the implementation of the “polluter-pays” principle.
- 113.** By the end of 2004, Hong Kong had a remaining landfill capacity of around 90 million tonnes. It is estimated that our landfills will last only 6 to 10 years if MSW continues to grow at the current trend. All the measures outlined above will make it possible to extend their lives, yet we will still have to take the residues from the IWMF and explore options for new landfill space. A study in January 2003 looked into the feasibility of extending the three strategic landfills and identified new potential landfill sites. The study showed that it will cost \$8.3 billion to extend the lives of the current landfills from between 5 and 15 years. Commissioning of these extensions will be required in the early 2010s to mid-2010s.
- 114. The reality is that we will continue to rely on landfills as our final means of disposal.** More studies will be conducted to consider new landfills but it is important to note that, based on our focus on waste avoidance and recovery and recycling, we now have bought enough time for longer term strategic planning and hopefully reduced the need for future facilities.

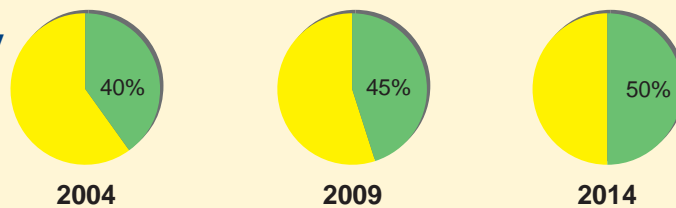
SUMMARY

115. The Government's strategy is based on the three target areas of avoidance and minimisation; reuse, recovery and recycling; and bulk reduction and disposal. Within each target area is a series of planned initiatives, each a goal in itself that in turn contributes to the achievement of the target. The driving force of the strategy comes from the policy tools of waste charging, PRSs and landfill disposal bans. These are supported by public education and partnership, and legislation. This strategy will allow us to achieve our targets, as shown below in the projected results.

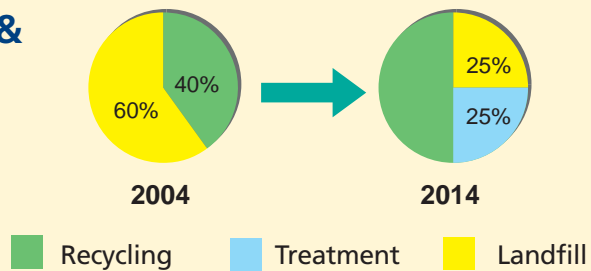
MSW Avoidance



MSW Recovery



MSW Treatment & Disposal



■ Recycling
 ■ Treatment
 ■ Landfill

Our future rolled out



THE WAY FORWARD

SETTING THE DIRECTION

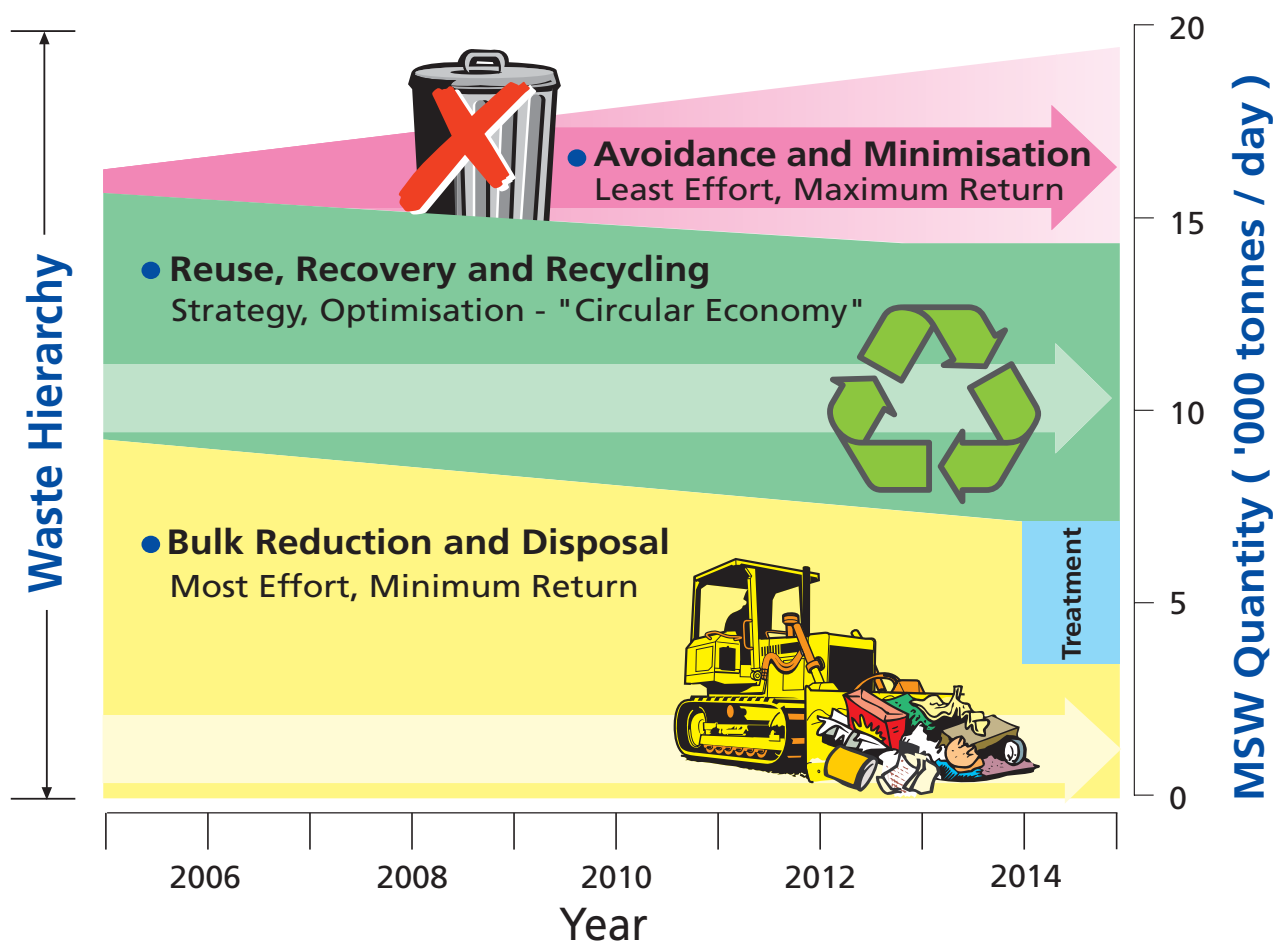
- 116. Status quo is not an option.** Hong Kong will exhaust its landfill space in the next 6 to 10 years. Land is scarce in Hong Kong, and must be used wisely. We must find a sustainable system to manage our MSW. We will continue to adopt a three-tier approach to MSW management, namely: i) avoidance and minimisation; ii) reuse, recovery and recycling; and iii) bulk reduction and disposal. The Government's focus is, and will continue to be, on waste avoidance and recovery, but bolder steps have to be taken to improve the already high recovery rate.
- 117. The Government must take the lead, while the public must take ownership.** The Government cannot solve the MSW problem alone. The public must recognize the problem and work together to achieve a sustainable way of life. The SDC has engaged a wide range of stakeholders in an open, honest and broad-based discussion. This Policy Framework for the ten years from 2005 to 2014 proposes the milestones to be met by the Government and the public hand-in-hand.

HOW THE STRATEGY WILL WORK

- 118. MSW management must follow the "polluter-pays" principle.** Making polluters pay makes sense from both economic and environmental angles. The Government has made significant headway in putting the "polluter-pays" principle at work in our charging scheme on construction wastes. Yet, the absence of a charging scheme for MSW, which is now dealt with by the public purse, has fed a consumption-led lifestyle where old or surplus items are casually thrown away. The environmental cost must return to the equation in order to close the loop for a "circular economy".
- 119.** We propose to impose an explicit charge on MSW so that everyone can fully appreciate the significant environmental costs entailed by a consumption-

led lifestyle. Placing a charge on MSW makes everyone in Hong Kong think twice when making purchasing and disposal decisions that will benefit their bottom line and also to make a commitment to Hong Kong's well-being. It is this change in people's attitudes towards waste and purchasing and disposal habits that is paramount in reducing the flow of MSW to landfills.

- 120. PRSs should be put in place to ensure that "end-of-life" products are recycled or properly treated.** To complement our efforts in minimizing and reducing waste through the charging scheme, the community, including the consumers, the retailers, the importers and the producers, must accept the responsibility for recycling and treating "end-of-life" products and materials in a sustainable manner. Overseas experience has shown that PRSs not only divert a significant portion of MSW away from precious landfills, but also help nurture a recycling industry that creates jobs and generates economic growth. As an advanced economy with green conscience, Hong Kong should put PRSs in place.
- 121. Landfill disposal bans can further protect our precious landfills.** To render our landfills more stable and alleviate long-term environmental problems, we propose to ban specific products and materials at landfills. Such bans would complement our efforts in PRSs so that a stable source of used products and materials can be fed to sustain our recycling industry in the long run.
- 122. We shall adopt state-of-the-art technology to treat unavoidable waste.** While our best efforts would be made in reducing and recycling waste, the reality is that there will still be unavoidable waste that needs proper treatment before disposal at the landfills. Hong Kong should adopt state-of-the-art technology to treat unavoidable waste in a cost-effective, yet environmentally sustainable, manner. To catch up with international trends, we propose incineration, which has been widely adopted overseas, as the core technology for our final waste treatment, while, of course, adopting stringent emission standards that command public confidence.



123. Legislation and education are complementary to our policy tools.

We need to put in place appropriate legislation to implement our policy tools. Yet, enforcement and sanction can only have limited success without the public taking ownership of the problem. Thus, sustained education programme is indispensable in our overall strategy so that the community at large is part of the solution of MSW management.

PUTTING IT TOGETHER

124. Hong Kong's strategy towards sustainable MSW management is underpinned by waste charging, PRSs and landfill disposal bans. The Policy Framework shows how these policy tools come together to achieve our overall objective.

125. MSW management is a top priority in our policy agenda. It is now the time to step up our efforts in tackling the imminent MSW problem. We have set out in this Policy Framework the proposed action plan. We sincerely invite the community at large to share our vision and tackle the problem at source. Only through a shared vision and concerted efforts of the Government and the public can we guarantee success in resolving our MSW problem.



OUR FUTURE IS IN OUR HANDS

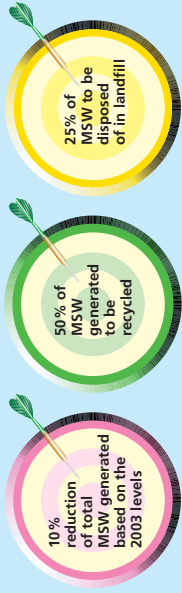
- 126. Let us plant the seed of quality life for our future generations together.** Sustainable MSW management is not only about solving an imminent problem, but also about a long-term investment for our future generations. It is neither economically nor morally sound to burden our children with cleaning up the mess we leave behind. This Policy Framework calls for a wide range of actions, and more importantly, an investment that is guaranteed a multi-fold return for our children and their children. We invite you all to face up to the challenge of changing our habits, and work together to ensure that the vibrancy, prosperity and natural beauty of Hong Kong is not a memory in the past, but a reality in the future.

SUMMARY OF ABBREVIATIONS

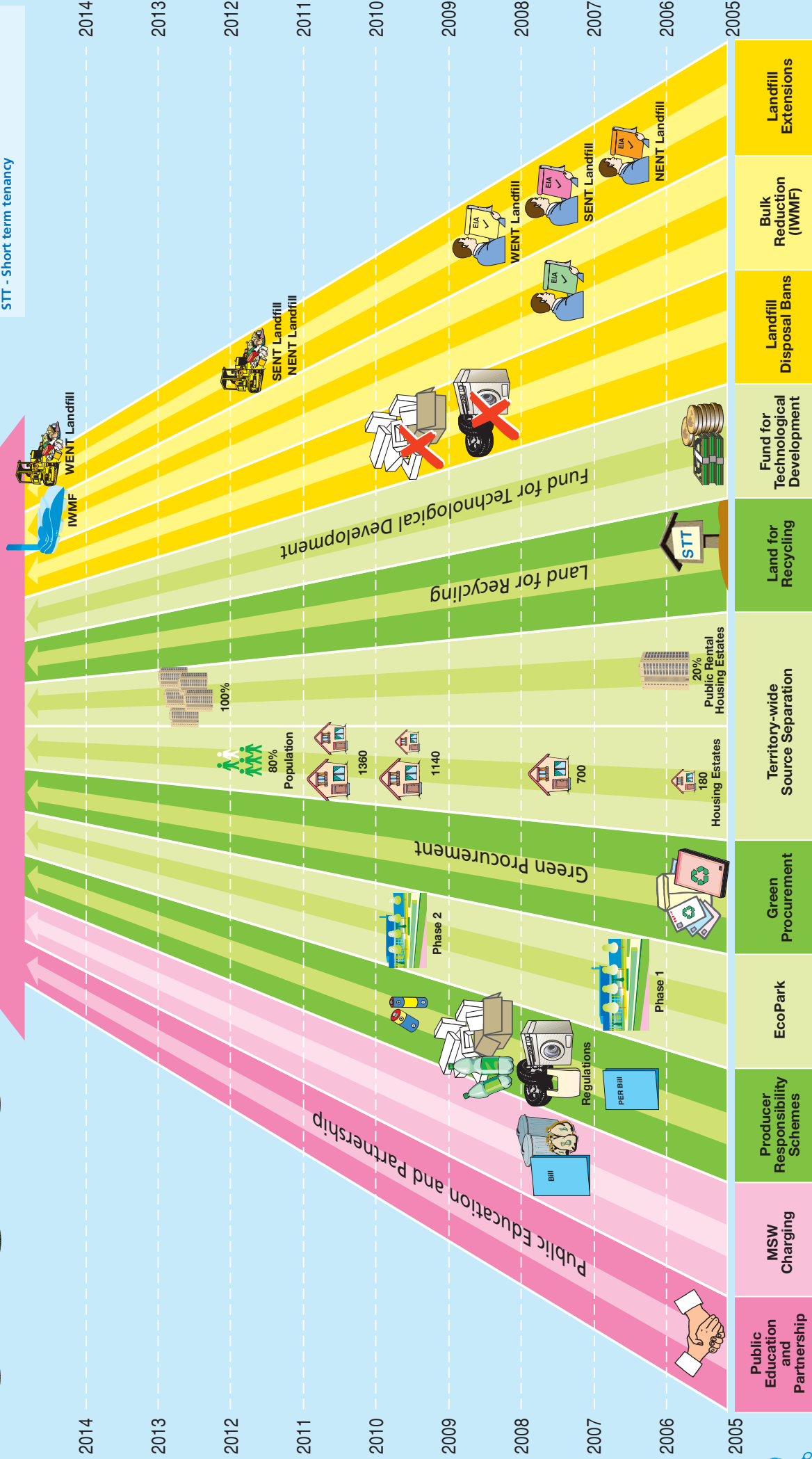
ACE	Advisory Council on the Environment
AG	Advisory Group on Waste Management Facilities
DEP	Director of Environmental Protection
ECC	Environmental Campaign Committee
ECF	Environment and Conservation Fund
EEE	Electrical and electronic equipment
EIA	Environmental Impact Assessment
HKGSA	Hong Kong Green Pre-School and Green School Award
IWMF	Integrated Waste Management Facilities
LFG	Landfill gas
MBT	Mechanical-biological treatment
MSW	Municipal solid waste
NENT	North-East New Territories Landfill
NGO	Non-government organisation
PER Bill	Product Eco-responsibility Bill
PRH	Public rental housing
PRS	Producer responsibility scheme
RCP	Refuse collection point
RDF	Refuse derived fuel
RTS	Refuse transfer station
SDC	Council for Sustainable Development
SEAS	School Environmental Award Scheme
SENT	South-East New Territories Landfill
SEPAS	Student Environmental Protection Ambassador Scheme
STT	Short term tenancy
WEEE	Waste electrical and electronic equipment
WENT	West New Territories Landfill
WRFP	Waste Reduction Framework Plan

A Policy Framework for the Management of Municipal Solid Waste (2005-2014)

2014 Targets



MSW - Municipal Solid Waste
 PER Bill - Product Eco-responsibility Bill
 IWMF - Integrated Waste Management Facilities
 EIA - Environmental Impact Assessment
 STT - Short term tenancy



USEFUL WEBSITES

A Policy Framework for the Management of Municipal Solid Waste (2005-2014)

<http://www.epd.gov.hk/epd/msw/>

First Sustainable Development Strategy for Hong Kong

<http://www.susdev.org.hk/en/Strategy/index.html>

Waste Reduction Framework Plan

http://www.epd.gov.hk/epd/english/environmentinhk/waste/prob_solutions/wrfp_initiative.html

Public education & Partnership

<http://www.ecc.org.hk/new/index2.html>

http://www.epd.gov.hk/epd/english/news_events/current_issue/partnership_waste_reduction.html

http://www.epd.gov.hk/epd/english/environmentinhk/waste/prob_solutions/wpp_wastewise.html

Source separation of Domestic waste

http://www.epd.gov.hk/epd/english/environmentinhk/waste/prob_solutions/waste_super3r.html

Voluntary Producer responsibility schemes

http://www.epd.gov.hk/epd/english/environmentinhk/waste/prob_solutions/waste_rbp.html

Green Procurement

http://www.epd.gov.hk/epd/english/how_help/green_procure/green_procure.html

Funding for technological development

http://www.epd.gov.hk/epd/english/environmentinhk/waste/prob_solutions/wrfp_funding.html

Integrated Waste Management Facilities

<http://www.epd.gov.hk/epd/iwmf>

Advisory Group on Waste management Facilities

http://www.epd.gov.hk/epd/english/boards/advisory_group/maincontent.html



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