

A. Introduction

The Audit Commission ("Audit") conducted a review to examine the Government's efforts in managing municipal solid waste ("MSW").

Background

2. MSW¹, commonly called "trash" or "garbage", includes wastes such as durable goods (e.g. tyres, furniture), nondurable goods (e.g. newspapers, plastic plates/cups), containers and packaging (e.g. milk cartons, plastic wrap), and other wastes (e.g. yard waste, food waste²). It comprises solid waste from households, commercial and industrial ("C&I") sources, but excludes construction and demolition waste, chemical waste and other special waste. The most common items disposed of as MSW are paper, food, plastics and metals.

3. In 2014, Hong Kong, with a population of 7.27 million, produced 5.62 million tonnes of MSW. Out of the 5.62 million tonnes of MSW, 3.57 million tonnes (63%) were disposed of at landfills and the remaining 2.05 million tonnes (37%) were recovered for recycling. Compared to the published statistics in 2010, MSW quantity disposed of at landfills had increased by 7.2% from 3.33 million tonnes in 2010 to 3.57 million tonnes in 2014, and MSW recovery rate had decreased from 52% to 37%. Subject to the Legislative Council ("LegCo") Finance Committee ("FC")'s funding approval for West New Territories Landfill extension works and after completing the approved and proposed extension works for the other two landfills, namely, Southeast New Territories Landfill and Northeast New Territories Landfill, the existing three landfills in Hong Kong would reach their capacities from 2023 to 2034.

4. As the executive arm of the Environment Bureau ("ENB"), the Environmental Protection Department ("EPD") is responsible for implementing waste management policies and strategies.

1 Hong Kong generates several types of solid waste. It includes MSW, which comes from domestic, commercial and industrial sources; construction waste, which arises from construction, renovation and demolition activities; and other special wastes such as chemical waste and livestock waste. In 2014, a total of 5.42 million tonnes of waste were disposed at landfills, of which 66% (3.57 million tonnes) were MSW.

2 Please see Chapter 2 of Part 8 of this Report for "Reduction and recycling of food waste".

5. In December 2005, EPD published the "Policy Framework for the Management of Municipal Solid Waste (2005-2014)" ("the 2005 Policy Framework"), which set out strategies, targets and action plans on avoidance and minimization; reuse, recovery and recycling; and bulk reduction and disposal of MSW. The waste reduction and recycling targets and related action plans were updated in January 2011 ("the 2011 Review"). In May 2013, ENB published the "Hong Kong Blueprint for Sustainable Use of Resources (2013-2022)" ("the 2013 Blueprint"), which set out targets to reduce the per-capita-per-day MSW disposal rate from 1.27 kilogram ("kg") in 2011 to 1 kg or less by 2017, and further to 0.8 kg or less by 2022.

6. As of March 2014, the capital costs of providing the three landfills and the refuse-transfer-station network were \$4,129 million and \$2,724 million respectively. In 2014-2015, the estimated recurrent expenditure of EPD's waste management programme was \$2,049 million, of which \$705 million (34%) and \$419 million (20%) were for meeting the operation costs of the three landfills and the refuse-transfer-station network respectively. The estimated operation cost (including collection and transfer cost) of disposing of a tonne of MSW was \$520.

The Committee's Report

7. The Committee's Report sets out the evidence gathered from witnesses. The Report is divided into the following parts:

- Introduction (Part A) (paragraphs 1 to 9);
- Reduction in municipal solid waste (Part B) (paragraphs 10 to 31);
- Recovery of municipal solid waste (Part C) (paragraphs 32 to 43);
- Recycling of municipal solid waste (Part D) (paragraph 44);
- Treatment and disposal of municipal solid waste (Part E) (paragraphs 45 to 58);
- Way forward (Part F) (paragraphs 59 to 61); and
- Conclusions and recommendations (Part G) (paragraphs 62 to 64).

Public hearings

8. The Committee held two public hearings on 7 and 29 December 2015 to receive evidence on the findings and observations of the Director of Audit's Report ("Audit Report").

Opening statement by the Acting Secretary for the Environment

9. **Ms Christine LOH Kung-wai, Acting Secretary for the Environment**, made an opening statement at the beginning of the Committee's first public hearing held on 7 December 2015, the summary of which is as follows:

- reducing the per-capita-per-day MSW disposal was the key objective of the 2013 Blueprint. There were many areas in the 2013 Blueprint that were a continuation from the 2005 Policy Framework, but there were also areas of departure. A major point of departure was the adoption of a single target to reduce per-capita-per-day MSW disposal because this was the most pertinent objective;
- if the per-capita-per-day perspective was used to look at how Hong Kong had done since 2005, the per-capita-per-day MSW disposal in 2014 was 1.35 kg, showing a slight decrease as compared to 1.38 kg in 2005;
- as pointed out in the Audit Report, the MSW recovery rate increased from 43% in 2005 to 52% in 2010, but then dropped significantly to 37% in 2013. In fact, the Administration noticed in 2012 major fluctuations in the domestic-export statistics on recyclable plastics. The Administration took the initiative to commission an independent consultant in late 2012 to undertake a study to look into this. The study concluded that the current methodology used was the most appropriate approach for Hong Kong as a free trading port. In response to the consultant's recommendations, EPD, the Census and Statistics Department ("C&SD") and the Customs and Excise Department ("C&ED") had taken improvement measures;
- the Administration shared the concern raised in the Audit Report about the implementation progress of the producer responsibility schemes ("PR schemes") and MSW charging scheme. The Audit Report set out the reasons for the longer-than-expected time required, particularly

Government's efforts in managing municipal solid waste

the fact that each scheme had to go through comprehensive public consultation and stringent legislative vetting procedures;

- the development of the EcoPark was one of the Government's key measures to support the local environmental industry. Since 2012, 10 tenants at EcoPark had successively commenced operation. Two tenants were taking forward the planning and construction of their plants, while another had finished construction and machine installation and was ready for trial runs;
- when estimating the time for landfills reaching design capacity, the Government would take account of factors such as historical trends of waste disposal and projections of population growth. That said, EPD would take on board Audit's recommendation that when submitting future funding applications, EPD should make every effort to provide LegCo with the basic assumptions and quantifiable information used in estimating the remaining serviceable lives of landfills;
- the Administration commenced a long-term planning study on waste disposal infrastructure in September 2015. Based on the concepts of achieving a circular economy and building a smart city, the study would identify the additional strategic and regional facilities required in Hong Kong for bulk transfer and disposal of MSW, with a view to reducing the reliance on landfills and achieving sustainable development in the long run; and
- the Administration would continue to actively take forward the measures set out in the 2013 Blueprint, and would strengthen its efforts to clearly publicize the significant landfill problem. While the Administration was fully aware of citizens' aspirations for a quality environment, the Administration had to drive behavioural changes within the community to reduce waste at source and enhance participation in waste recovery. The Administration would endeavour to formulate waste management policies from new perspectives, and would collaborate with LegCo and every sector in society to ensure their smooth implementation, with a view to building a better living environment.

The full text of Acting Secretary for the Environment's opening statement is in *Appendix 7*.

B. Reduction in municipal solid waste

MSW-generation quantities having incorrectly subsumed unknown quantities of import recyclables

10. According to paragraph 2.8 (b) of the Audit Report, EPD conducted annual waste recovery surveys to obtain related statistics for locally-generated recyclables recovered for local use. The Committee asked how these surveys were conducted, and about the Administration's views on the accuracy and reliability of the data gathered by using these surveys in estimating the quantities of locally-generated MSW recovered for local use.

11. **Mr George NG Wai-wah, Senior Statistician of EPD**, said at the public hearing and **Ms Anissa WONG Sean-ye, Director of Environmental Protection**, explained in her letter dated 21 December 2015 (*Appendix 8*) that:

- for quantity of waste disposal, EPD obtained the relevant statistics compiled based on weighbridge data recorded at entrances of waste treatment facilities, supplemented by data obtained from the Waste Composition Survey on the composition of waste disposed of at landfills by waste type;
- for quantity of waste recovered, there was no environmental legislation at present mandating the recording and declaration of the quantities of general recyclables collected and processed by the recycling businesses. Therefore, EPD compiled the statistics based on domestic-exports statistics of recyclables which measured the quantities of locally-generated recyclables exported for recycling outside Hong Kong. These statistics were supplemented by data obtained from the Waste Recovery Survey ("WRS") which measured the quantities of locally-generated wastes recycled locally into recycled products. There was no overlapping in these two sets of data;
- EPD commissioned a survey contractor every year to conduct the annual WRS with the following major operation features:
 - (a) WRS questionnaire was designed in a way to ensure that the quantities of locally-generated recyclables recycled locally into final recycled products could be accurately captured;

Government's efforts in managing municipal solid waste

- (b) prior to data collection, frontline field interviewers received appropriate training in the presence of EPD's officers;
 - (c) the WRS contractor performed telephone/face-to-face interviews using a well-structured questionnaire to obtain the required recovery data from companies in the recycling industry. Each interview took about 30 minutes;
 - (d) in completing the survey, about 1 500 companies were interviewed. These companies were from the full listing of companies in the local recycling industry updated annually based on the latest Central Register of Establishments maintained by C&SD. The listing was supplemented by the directory of local waste collectors and recyclers maintained by EPD. All companies and green groups identified in the survey were fully enumerated under WRS; and
 - (e) in recent years, WRS achieved response rates ranged from 75% to 77%, which were statistically acceptable considering that the WRS was a voluntary survey;
- the accuracy and reliability of the waste statistics related to waste disposal was beyond doubt as they were based on factual weighbridge data recorded at entrances of waste treatment facilities;
 - the accuracy of the quantities of waste recovery mainly depended on the accuracy of the declared domestic exports statistics of recyclables, as most of the locally-generated recyclables were exported for recycling. For instance, for the years 2013 and 2014, the proportion of locally-generated recyclables exported for recycling were 93% and 98% respectively of the total quantity of waste recovery; and
 - as for WRS, the data accuracy very much depended on the provision of sufficient and accurate data by the recyclers concerned. EPD had no statutory authority to verify the reported data with supporting business documents. Notwithstanding this, EPD conducted verification checks with the responding companies by selecting a random sample of the survey returns submitted by the survey contractor. In light of above, EPD had reasons to be confident on the accuracy and reliability of WRS to be at least as good as that of other surveys professionally conducted on voluntary basis.

12. The Committee noted from paragraph 2.12 and Table 2 of the Audit Report that the aggregates of the quantities of "import recyclables" plus "local recyclables recovered for export" significantly exceeded the quantities of export recyclables in 2009-2011. The Committee asked for the reasons for such significant discrepancy and the possibility that a vast quantity of import recyclables had been disposed of at the local landfills in that period.

13. **Director of Environmental Protection** said at the public hearing and stated in her letter dated 21 December 2015 (*Appendix 8*) that:

- based on EPD's analysis of the relevant data and with reference to Consultant Study commissioned in late 2012 on Comprehensive Review on Estimation of Waste Recovery Rate ("the Consultant Study")³, EPD assessed the "excess" of "the aggregates of the quantities of import recyclables plus local recyclables recovered for export" against the "quantities of export recyclables" in 2009-2011 could basically be attributed to the amount of "re-export recyclables" wrongly declared as "domestic-exports of recyclables" by export declarants;
- there was no practical means to ascertain the exact extent of mis-reporting of re-exports as domestic exports during the three years as it was not possible to re-verify past export declarations with the declarants;
- EPD's assumptions (i.e. 30% to 40% of re-exports were mis-reported) were conservative in light of the findings of the Consultant Study that a majority of recyclers and traders were actually confused and could not tell the difference between re-exports of recyclables and domestic exports; and
- amongst the different types of imported recyclables, plastic recyclables constituted the major proportion (about 80% to 84%) in recent years. Despite the rise in the quantities of declared imported recyclables particularly those of plastics recyclables in the range of 4.0 to 4.8 million tonnes in 2009-2011, the annual disposal quantity of waste plastics at landfills had remained relatively stable in the range of 0.6 to 0.7 million tonnes.

3 Please refer to paragraph 2.16 in the Audit Report for details of the Consultant Study.

14. The Committee further asked how EPD could prevent the disposal of import recyclables at local landfills. **Director of Environmental Protection** explained at the public hearing and stated in her letter dated 21 December 2015 (*Appendix 8*) that in line with the international practices adopted by other countries/places, Hong Kong laws strictly prohibited the disposal of imported waste locally. It was an offence to import waste for disposal in Hong Kong. EPD had close surveillance at landfills and refuse transfer stations on all incoming waste loads to prevent illegal disposal of imported recyclables. All vehicles entering a waste disposal facility must stop at the weighbridge for weighing and inspection. The drivers were required to open hood covers of their vehicles to facilitate inspection of the waste transported via closed circuit television system. If it was suspected that imported recyclables were delivered to the landfill for disposal, EPD would not only intercept and trace the source but also contacted the owners to facilitate recycling of the waste so as to effectively prevent the disposal of imported recyclables at landfills. On interception of any attempt to dispose of imported recyclables in landfills, enforcement action would be taken. In the execution of the above control, EPD had not found loads of imported recyclables disposed of at landfills.

15. According to paragraph 2.16 of the Audit Report, EPD commissioned a consultant to review the abnormal fluctuations of MSW-recovery rates in 2012 and the consultant reported in February 2014 that the fluctuations were likely due to the incorrect treatment of import recyclable plastics as locally-generated waste plastics recovered for export. The Committee enquired about the follow-up actions that EPD, C&SD and C&ED had taken to rectify the incorrect treatment by the relevant traders and exporter.

16. **Director of Environmental Protection** explained at the public hearing and in her letter dated 21 December 2015 (*Appendix 8*) that the relevant departments, including EPD, C&SD and C&ED had implemented enhancement measures in the collection of export data of recyclables, which included preparing additional guidelines and training workshops to help recyclers and export trade declarants to better understand the declaration requirements (in particular regarding the definition of "domestic export" and "re-export" applicable to recyclable materials), strengthening checking of export declarations and collecting additional data from export trade declarants on the source of recyclable plastics declared as domestic export on a sample basis.

17. **Mr Leslie TANG Wai-kong, Commissioner for Census and Statistics**, explained at the public hearing and in his letter dated 15 December 2015 (*Appendix 9*) that C&SD had implemented the following measures since April 2014

to facilitate declarants of domestic exports of waste plastics to understand declaration requirements and relevant definitions with a view to lodging trade declarations of domestic exports and re-exports properly:

- six thematic workshops were arranged during April 2014 to November 2015 for traders and recyclers of waste plastics. During the workshops, guidelines on export declaration requirements of waste plastics were provided to the participants (over 70 representatives from over 60 traders and recyclers); and
- the enhanced quality check procedures had been implemented since April 2014 by selecting a sample of trade declarants of domestic exports of waste plastics. The sampled declarants needed to provide supplementary information on the declared waste plastics, including whether the waste plastics were recovered locally or processed from imported waste and type of processing in Hong Kong. The procedures were to confirm that the declarants clearly understood the definition of domestic exports and re-exports and used the correct code for declaration.

18. **Commissioner for Census and Statistics** further explained that according to the results of the enhanced quality check procedures on domestic exports of waste plastics, in the second quarter of 2014, around 10% of the domestic exports of waste plastics should be re-exports. In the third quarter of 2015, the corresponding percentage was less than 1%. This reflected that the measures implemented since April 2014 had been effective in enabling traders of domestic exports of waste plastics to clearly understand the definition of domestic exports and re-exports and correctly declare domestic exports and re-exports.

19. **Mr Roy TANG Yun-kwong, Commissioner of Customs and Excise**, said at the public hearing and stated in his letter dated 14 December 2015 (*Appendix 10*) that C&ED would work together with C&SD to strengthen the verification of the information on export declarations by randomly selecting trade declarants of domestic exports of recyclable plastics and requiring them to provide supplementary information on the declared recyclable plastics, including whether the recyclable plastics were recovered locally or processed from imported recyclable materials and type of processing in Hong Kong. C&ED would investigate all irregularities cases referred by C&SD and would initiate prosecution against any person who knowingly or recklessly lodged any declaration that was inaccurate in any material particular.

Per-capita-per-day domestic MSW generation of Hong Kong comparing to other cities

20. With reference to Figure 6 in paragraph 2.18 of the Audit Report, the Committee enquired about the reasons for per-capita-per-day domestic MSW generation of Hong Kong higher than those of Taipei City, Seoul City and Metro Tokyo in 2011.

21. **Mr WONG Kam-sing, Secretary for the Environment**, said at the public hearing and **Director of Environmental Protection** stated in her letter dated 21 December 2015 (*Appendix 8*) that:

- as different cities had different geographical, social, economic and cultural circumstances, it would be extremely difficult to draw definitive conclusions on reasons for variations in their communities' behaviour. It was also relevant to note that the compilation of statistics of different cities might vary due to the differences in definitions and methodologies;
- it was useful to examine the trend of waste arising in these cities based on comparable parameters and relate this with the implementation of specific policies or programmes. For this purpose, the Administration had plotted the trend of domestic/household MSW disposal in the three places and highlighted on the same chart their waste related policy developments (*Appendix 8*). The Administration had the following observations:
 - (a) in both Taipei and South Korea, development of incinerators and landfills proceeded before the implementation of mandatory MSW charging. This might have reflected the sense of urgency or critical situation felt by the community concerned on the waste situation, which might have driven waste reduction behaviour;
 - (b) the implementation of volume based MSW charging created the most significant impact on waste reduction. Other mandatory measures targeting at specific waste types helped further reduce waste generation but the impacts were less significant. In Hong Kong, the domestic MSW disposal rate showed reduction in 2004 and the trend continued until 2012, after which the rate remained stable and at the relatively low level as compared

with 2003. That could be attributed to a series of education and publicity measures that had been launched since 2004, as well as discussion on the critical situation of waste management and the need for additional treatment facilities such as incineration, extension of landfills, which started in 2005 along with the publication of a strategy-based Policy Framework document and consultation; and

- (c) updated and more focused plans for engaging the community attention to the imminent waste issues were made in the subsequent years, including the announcement of strategy on "Reduce, Recycle and Proper Waste Management" in 2011 and the issue of the 2013 Blueprint; and
- though the scale of reduction in domestic MSW arising in Hong Kong was smaller when compared with the other two places, Hong Kong had a similar trend of decline. With the implementation of the mandatory schemes which were either being considered by LegCo (i.e. PR schemes on waste electrical and electronic equipment ("WEEE") and glass beverage bottles) or under preparation (i.e. MSW charging), the Administration considered that it could drive behavioural change to reduce MSW disposal rate by 40% on a per-capita basis by 2022.

PR schemes

22. The Committee asked for the reasons for not meeting the time targets set in the 2005 Policy Framework for PR schemes on WEEE, vehicle tyres, glass beverage bottles, packaging materials and rechargeable batteries as revealed in paragraphs 2.24 and 2.26 of the Audit Report.

23. **Secretary for the Environment** said at the public hearing and **Director of Environmental Protection** supplemented at the public hearing and in her letter dated 21 December 2015 (*Appendix 8*) that:

- under the 2005 Policy Framework, it was the target to introduce three PR schemes into LegCo in 2007 for plastic shopping bags ("PSBs"), WEEE and vehicle tyres respectively, two in 2008 for glass beverage bottles and packaging materials respectively and one in 2009 for rechargeable batteries;

- the Administration introduced the legislative proposals for the first PR scheme for PSBs in 2007 as part of the Product Eco-responsibility Bill (which was subsequently enacted in 2008 as the Product Eco-responsibility Ordinance (Cap. 603)). The original legislative approach was that Cap. 603 would provide the framework for PR schemes whereas product-specific measures would be subsequently introduced through subsidiary legislation. This proposed approach echoed the ambitious timetables as set out in the Framework;
- the LegCo Panel on Environmental Affairs ("EA Panel") did not support this legislative approach. Instead it requested that each PR scheme should be implemented through legislative amendment to the enabling legislation and subject to the three-reading scrutiny of LegCo. More time was therefore needed to implement the various PR schemes under the latter legislative approach; and
- furthermore, the actual experience also demonstrated that it was impracticable to complete the necessary preparatory work in relation to research, analysis, trial (if needed), consultation and law drafting for a PR scheme within the target timeframe as originally proposed under the 2005 Policy Framework. Having reviewed the implementation of the PR schemes taking into account the latest development and the experience gained by the Administration, EPD had accorded priority to the PR schemes on the extension of PSBs, WEEE and glass beverage bottles for which the legislative proposals had been introduced into LegCo in May 2013, March 2015 and July 2015 respectively.

24. In reply to the Committee's enquiry regarding the progress and revised time targets for implementing the remaining three PR schemes on vehicle tyres, packaging materials and rechargeable batteries ("three remaining products"), **Director of Environmental Protection** said at the public hearing and stated in her letter dated 21 December 2015 (*Appendix 8*) that:

- as committed under the 2013 Blueprint, the Government would conduct studies on the PR schemes for three remaining products between 2016 and 2018. In conducting the studies, EPD would take stock of the present position of the relevant products as an environmental problem in Hong Kong including their current waste generation rate and effectiveness of the existing recycling efforts. EPD would then assess the need of any enhanced efforts to promote

their recycling and proper disposal and whether a PR scheme should be introduced;

- in 2014, about 21 tonnes per day ("tpd") of waste vehicle tyres was disposed of at the landfills. Rechargeable batteries were counted towards household hazardous wastes alongside paints, pesticides, fuels, cylinders, electrical appliances, computer products, mercury-containing fluorescent lamps and medicines, etc. and about 160 tpd of household hazardous wastes was landfilled in the same year. As regards packaging materials, EPD did not have specific disposal figures as they were unable to trace the source or uses of the waste at the landfills solely on the basis of the nature of materials; and
- in case a PR scheme was considered necessary and appropriate for a particular product, EPD would conduct further research with a view to drawing up the initial proposals for the regulatory framework and other complementary measures for public consultation and trade engagement as soon as practicable. The actual timetable for introducing the legislative proposals into LegCo would depend on complexity of individual PR schemes, including the applicability of experience accumulated through the first three schemes. In case more than one PR scheme was pursued and if circumstances permitted, EPD would aim to expedite actions and would not rule out the possibility of an omnibus bill which might carry legislative proposals for multiple PR schemes.

25. **Acting Secretary for the Environment** added at the public hearing that the Administration was planning to introduce the PR scheme on a new product, i.e. plastic bottles, as the current generation rate of plastic bottles was very high.

26. The Committee asked about the current measures adopted by the Administration to encourage the recycling of the three remaining products before the relevant legislation was enacted. **Director of Environmental Protection** stated in her letter dated 21 December 2015 (*Appendix 8*) that with the support of the relevant trades, a voluntary PR scheme had been in place to promote the recycling and proper disposal of rechargeable batteries since April 2005. Since 2013, following targeted publicity through the Voluntary Agreement on Management of Mooncake Packaging, EPD had been monitoring the eco-friendliness of packaging methods of mooncake products through periodic surveys. As for vehicle tyres, EPD had been monitoring the waste generation and the annual waste statistics showed that its

landfill disposal dropped drastically from a daily average of 49 tpd in 2005 to 21 tpd in 2014 (and at one point less than 2 tpd in 2011). On the other hand, a piece of land in the EcoPark had been leased to a private recycler to develop a rubber vehicle tyre treatment plant, which was scheduled for commissioning in early 2016.

27. According to paragraph 2.42 of the Audit Report, in May 2011, EPD informed LegCo that Phase 1 of PR scheme on PSBs ("PSB Phase 1") had been implemented successfully, and that based on two landfill surveys conducted in mid-2009 (before PSB Phase 1) and mid-2010 (after PSB Phase 1), the number of pertinent PSBs (which bore the features of supermarkets, convenience stores and personal-item stores) disposed of at the landfills had decreased from 657 million in 2009 to 153 million in 2010 (77% reduction). In this regard, the Committee enquired about:

- whether guidelines had been issued by EPD for its landfill contractors to follow in making the estimation above; and
- the Administration's views on the accuracy of such data from the landfill surveys in reflecting the effectiveness of the first phase of the PR scheme on PSBs.

28. **Senior Statistician of EPD** said at the public hearing and **Director of Environmental Protection** stated in her letter dated 3 December 2015 (*Appendix 11*) that:

- detailed methodology concerning waste sampling, manual sorting, weighing and recording etc. were specified in the contract documents for the survey contractor who must follow such methodology as a mandatory contractual requirement. Appropriate training was provided to frontline field workers. Apart from briefing, real case examples were given to better illustrate how they were expected to categorize the PSBs by identification of their visible features. The survey contractor deployed supervisory staff to provide on-site guidance to the field workers and exercise quality control. EPD inspectorate staff were also present throughout the field work period to ensure that the surveying processes were properly carried out;
- on the whole, the disposal surveys were designed to meet an overall margin of error of around 10% at a 95% confidence level, which by

professional statistical standards means that the survey results (including the total disposal of PSBs) were valid; and

- in the Audit Report, observations were made that the number of "pertinent PSBs" found at landfills from the disposal surveys was significantly greater than that of PSBs distributed by registered retailers at registered outlets based on their returns. In response to these observations, the Administration had informed Audit that a registered retailer under PSB Phase 1 must submit a quarterly return providing information on, amongst other things, the total number of PSBs provided directly or indirectly to customers in each of his registered retail outlets during the reporting period. However, for the reasons as set out in paragraph 2.50 of the Audit Report, the Administration was unable to compile statistics on the number of PSBs belonging to registered retail outlets from the disposal surveys. Notwithstanding this limitation, the Administration considered that the number of PSBs disposed of at the landfills was still the most relevant indicator on the effectiveness of the environmental levy in reducing the use of PSBs.

29. In reply to the Committee's request, **Director of Environmental Protection** provided the methods used by EPD landfill contractors to estimate the number of pertinent PSBs disposed of at landfills in the landfill surveys in her reply dated 3 December 2015 (*Appendix 11*).

30. The Committee further asked about the measures to strengthen the gathering of reliable statistics in assessing the effectiveness of PR schemes. **Director of Environmental Protection** stated in her letter dated 21 December 2015 (*Appendix 8*) that since the Administration had extended the PR scheme on PSBs to cover the entire retail sector with effect from 1 April 2015, Audit's concern that some "pertinent PSBs" were distributed by non-registered retail outlets was no longer relevant. The Administration planned to strengthen its efforts in assessing the effectiveness of the extension in the PR scheme through:

- conducting periodic telephone surveys to gauge information on consumers' attitude and behavioural change in response to the PR scheme;
- reviewing the information published by the Hong Kong Retail Management Association which had agreed to coordinate the voluntary reporting of the relevant statistics by its members;

- commissioning dedicated surveys to assess the likely sources of the PSBs classified under the "Others" category; and
- as for the new PR schemes for WEEE and glass beverage bottles, their effectiveness would mainly be assessed on the basis of the amount of WEEE and glass containers recovered through the respective schemes. The relevant statistics could be compiled directly from the records that would be submitted by the management contractors.

Post-implementation review of the 2005 Policy Framework

31. In response to the Committee's enquiry on Audit's recommendation for the Administration to conduct a post-implementation review of the 2005 Policy Framework, **Director of Environmental Protection** stated in her letter dated 21 December 2015 (*Appendix 8*) that:

- in the 2005 Policy Framework, the Administration set out targets to reduce waste generation, increase recovery rate and reduce disposal quantity. In light of the initial achievements and experience gathered, EPD thoroughly reviewed its positions and updated the targets and actions plans in 2011 to cope with the latest challenges;
- taking stock of the experience gained in the implementation of the Policy Framework and the 2011 Review, as well as the latest development in Hong Kong and elsewhere, the Administration had consolidated past actions and updated the relevant policy tools and implementation strategy in the 2013 Blueprint. The Administration had briefed EA Panel on the progress of its efforts in 2009, 2011, 2012 and 2013; and
- the Administration did not consider that the 2005 Policy Framework, the 2011 Review and the 2013 Blueprint were unrelated documents. The 2013 Blueprint represented continued refinement of the action plans and the timetables in the light of their experience and the social, economic and political developments. In the Administration's view, it would be more fruitful to focus on the implementation of the 2013 Blueprint at this stage. The Administration would brief EA Panel on the progress and initial achievements of the waste management measures promulgated in the 2013 Blueprint in 2016 when the waste statistics for 2015 was available.

C. Recovery of municipal solid waste

Over-estimation of MSW-recovery rates

32. The Committee noted that there was a drastic decline of the MSW-recovery rates, from 52% in 2010 to 37% in 2013 and 2014, possibly as a result of the erroneous inclusion of import materials in the statistics. As such, the Committee asked whether EPD would consider setting a new target for MSW-recovery rate.

33. **Director of Environmental Protection** stated in her letter dated 21 December 2015 (*Appendix 8*) that:

- unlike the approach adopted in the 2005 Policy Framework, the 2013 Blueprint adopted a single target of reducing per-capita MSW disposal rate by 40% by 2022. This target was measurable in that it was based on direct weighbridge data recorded at the waste disposal facilities, and it was also more embracing as it quantified the combined effect of the different action plans for reducing waste generation at source and enhancing waste recovery and recycling;
- the 55% recovery rate mentioned in the 2013 Blueprint was not a target in itself. Rather it illustrated the different composition of the waste management structure in 2022 as compared with the base year of 2011 where the then recovery rate was 48%, if the Administration was able to achieve the various waste reduction measures set out in the 2013 Blueprint;
- if the recovery rate for 2011 needed to be adjusted due to mis-reporting by recyclers, then corresponding adjustment should be made for that in 2022 by using the same methodology. The end result was likely that the proportion of different components would remain the same; and
- as the Administration was now implementing in full steam the 2013 Blueprint action plans and mobilizing the community's participation in these plans, the Administration considered that it served no meaningful purpose to focus on past overtaken actions and to set a recovery target for the 2013 Blueprint when the emphasis should be on the more measurable MSW waste disposal rate.

Measures to raise the recovery rate of waste plastics

34. In response to the Committee's question regarding the measures to raise the recovery rate of waste plastics, **Director of Environmental Protection** stated in her letter dated 21 December 2015 (*Appendix 8*) that the Administration would continue to take multiple measures to promote recovery of waste plastics, including:

- to step up communication with property management companies and concerned parties to take initiatives to enhance the collection arrangement of recyclables such as enlisting their support for active participation in recycling, proper sorting of waste by their types, and rinsing the recyclables where possible;
- to continue to carry out promotional and publicity work under the Clean Recycling Campaign to drive behavioural change so as to enhance the cleanliness and the hygienic condition of waste plastics and other source separated recyclables. An enhancement in the quality and quantity of the recyclables increased their value and thereby reducing resource from being dumped at the landfills; and
- to leverage on the Recycling Fund to assist recyclers, including those which were small and medium-sized enterprises, in upgrading and expanding local recycling operations and network in the form of a matching fund. Through upgrading their operation, e.g., installing plastic washing and pelletizing machine, to enhance the value of recycled materials, they would be in a better position to tackle challenges posed by market fluctuations.

Source-separation Programme

35. As revealed in paragraph 3.34 of the Audit Report that in 2013, 1 008 (51%) of the 1 979 participating housing estates and 278 (32%) of the 860 participating C&I buildings did not provide EPD with the related statistics, which had adversely affected the assessment of the effectiveness of the Source-separation Programme ("SS Programme"). The Committee asked EPD to provide the measures to be taken to review the effectiveness of SS Programme.

36. **Mr Howard CHAN Wai-kee, Deputy Director of Environmental Protection(2)**, said at the public hearing and **Director of Environmental Protection** stated in her letter dated 21 December 2015 (*Appendix 8*) that EPD, in collaboration

with various stakeholders, had been taking multiple actions to raise public awareness of source separation of waste and clean recycling. These actions included promotion of the three-colour recycling bins system, educational and promotional activities to targeted recipients and publicity programmes on different themes to reach out to community members. All these efforts contributed to driving behavioural change of the public and cultivating a persistent habit to practise recycling frequently and properly. The Administration also planned to engage a consultant to conduct a review of the implementation of SS Programme and make recommendations to improve the programme, including how to encourage and strengthen the collection of statistics on recyclables collected by participating estates as well as to further enhance public awareness and participation rate, increase quantity of recyclables recovered. The Administration would refine its promotion strategy in the light of the review.

37. According to paragraph 3.37 of the Audit Report, due to the lack of reporting requirements in the recyclable collection service contracts, the Government did not have statistics on the quantities of recyclables collected from waste-separation bins ("WS bins") which were disposed of at landfills due to contamination or other reasons. The Committee asked:

- how EPD would monitor and review the effectiveness of the recyclables-collection scheme without the relevant statistics;
- whether EPD would consider requesting contractors to submit such information for public disclosure;
- measures to monitor the contractors to ensure that the non-contaminated recyclables would be transported to approved recyclers, and the results of these monitoring activities in the past years; and
- the total expenditure incurred for collecting recyclables from WS bins in the past five years.

38. **Director of Environmental Protection** explained at the public hearing and in her letter dated 21 December 2015 (*Appendix 8*) that:

- the Food and Environmental Hygiene Department ("FEHD") had engaged a contractor through outsourcing to provide recyclables collection service. The contractor was required to collect waste paper,

Government's efforts in managing municipal solid waste

metal and plastic from 2 850 public WS bins placed at locations such as pavements, refuse collection points, public markets, bus terminals and venues managed by schools, the Water Supplies Department and EPD. The expenditures incurred by FEHD on the contracts of collecting recyclables from WS bins over the past few years were:

Term of Service Contract	Contract Value (\$m)
August 2010 – July 2012	9.0
August 2012 – July 2014	12.9
August 2014 – July 2016	21.6

- according to the service contract, contractors must hand over the collected recyclables to the designated recycler for process. To improve monitoring and accountability, the service contract signed between FEHD and the contractor that took effect in August 2014 had included the following additional tender terms:
 - (a) to facilitate on-site monitoring, the contractor was required to use transparent plastic bags for collection of recyclables, and the bags should be printed with the words "used for collecting recyclables". Notices showing "FEHD contractor providing collection service for recyclables" should be displayed on both sides of the body of its collection vehicles;
 - (b) the contractor was required to nominate up to two local recyclers to receive and recycle plastic recyclables when submitting their bids for the contracts. Each recycler nominated should have independent capability and experience to properly process plastic recyclables at a designated recycling site; and
 - (c) FEHD might direct the contractor to change its recyclers if their performance was not satisfactory;
- FEHD had set up a comprehensive contract management mechanism under which the FEHD staff conducted regular and surprise checks to monitor the performance of the contractor. If any breach of contract provisions was found, the FEHD would take punitive actions accordingly, including issuing verbal warning, written warning and default notices. The monthly amount payable to the contractors who had received default notices would be deducted in the light of the breaches;

Government's efforts in managing municipal solid waste

- since August 2014, EPD had also set up an additional monitoring mechanism to ensure the plastic recyclables collected by FEHD's contractor would be properly processed by the engaged recycler. EPD had conducted site inspection to assess the recyclable processing ability of the nominated recycler and provided recommendation to FEHD at the tender stage. Since FEHD had awarded the contract in August 2014, EPD had conducted nine site visits to check the operation of the recycler;
- similar monitoring arrangement had been implemented to Agriculture, Fisheries and Conservation Department and Leisure and Cultural Services Department recyclables collection service contracts and it would be extended to cover paper and metal recyclables in the forthcoming contracts. Under the current FEHD contracts for the collection of the recyclables, the contractors were required to provide data on the quantity of recyclables collected. EPD would explore with FEHD how to enhance the disclosure of information related to the quantity of recyclables collected by the contractors and information on the amount of recyclables which were actually recovered or disposed of due to contamination;
- for WS bins placed at locations such as country parks, leisure and cultural facilities, public housing estates, government quarters and government office buildings, the maintenance and management were provided and paid for by relevant departments or property management companies. The costs incurred were generally included in the refuse disposal and cleansing management contracts as a whole and no breakdown of such items was available; and
- with a view to facilitating waste reduction and resource recovery, ENB would convene a Steering Group to review among other things the design and distribution of WS bins in public place and to recommend changes as appropriate.

39. With reference to paragraphs 3.39(a) and 3.40 of the Audit Report, the Committee further asked EPD to provide measures to strengthen promotion efforts to encourage participating housing estates and C&I buildings to provide EPD with statistics on recyclables collected from WS bins.

40. **Director of Environmental Protection** stated in her letter dated 21 December 2015 (*Appendix 8*) that at present, a list of participating housing estates/buildings and a list of award-winning housing estates and residential buildings in the annual competition under SS Programme was published on the EPD Hong Kong Waste Reduction website. While it was voluntary for participating housing estates and C&I buildings to provide statistics on recyclables collected from WS bins to EPD, the Administration planned to take the following measures to encourage them to report the relevant data to EPD:

- to organize commendation schemes to recognize the property management companies or their owners whose buildings had reported and attained increases in recyclables collected from WS bins. Subject to feedback from consultation with the stakeholders, the Administration was ready to promote transparency of the reports on the statistics to encourage participation of residents and workers in recycling;
- to provide guidelines to assist collectors and recyclers to provide summary and analysis of the types and quantity of recyclables collected from the participating housing estates and C&I buildings on a timely basis; and
- to organize training to frontline staff on the purpose and process to collate and compile the statistics from WS bins with a view to alleviating their perceived increase in workload or concerns on the additional resources required in the process.

41. Referring to Audit's recommendations in paragraphs 3.39(b) and 3.40 of the Audit Report, the Committee enquired about the progress on the publishing of the number of housing estates and the corresponding population which had provided EPD with statistics on recyclables collected and those not providing the statistics.

42. **Director of Environmental Protection** stated in her letter dated 22 December 2015 (*Appendix 12*) that the Administration had been publishing the list of all participating housing estates/buildings on the Hong Kong Waste Reduction Website. It would also publish on the website the number of housing estates/buildings and the corresponding population which had provided it with the statistics. As the two lists were publicly available, the Administration did not consider it necessary to publish a separate list singling out those housing estates not providing the statistics under a voluntary programme which aimed to incentivize

participation. The two lists would be updated regularly. To facilitate the public reading the information, the Administration would amend the website page layout and put the information on the "News & Events" page. The Administration planned that the revised website page and the figures be ready and published starting from April 2016.

43. In response to the Committee's enquiry on the progress on computing and publishing the per-household-per-day quantities of recyclables collected by the participating estates which had provided EPD with statistics on recyclables collected, **Director of Environmental Protection** stated in her letter dated 22 December 2015 (*Appendix 12*) that:

- the Administration would consider ways to disclose the per-household-per-day quantities of recyclable waste collected by participating estates/buildings without diminishing the original intent of incentivizing good waste reduction behaviour or affecting the overall participation rate of a voluntary programme; and
- as a first step, the Administration would consider publishing regularly an "overall average per-household quantities of recyclables collected for the programme". Together with the information on number of housing estates and corresponding population returning statistics, the Administration planned to have the overall average per-household quantity figure be published on the Hong Kong Waste Reduction Website, on the "News & Events" page, starting from April 2016.

D. Recycling of municipal solid waste

Operation of Ecopark

44. In response to the Committee's enquiry about the operation of EcoPark, **Director of Environmental Protection** said at the public hearing and stated in her letter dated 21 December 2015 (*Appendix 8*) that:

- there were currently 13 tenants in the EcoPark engaging in processing a variety of waste types, including those identified for control under PR schemes, those that were difficult to recycle therefore had limited local recycling outlets such as food waste, waste wood and waste cooking oil, as well as those that lacked a robust market for the

processed materials such as waste rubber tyres. The total pledged capital investment by the tenants had exceeded \$300 million;

- as more tenants started commissioning their operations, the original projected annual throughput set at 58 600 tonnes in 2006 had been exceeded. In their tender returns, tenants had to pledge for minimum outputs. The current tenants had in total pledged to handle 200 000 tonnes in a full year upon full commissioning. In 2014, the amount of recyclables recovered by the EcoPark tenants amounted to over 150 000 tonnes;
- the Administration would continue to raise the community awareness of the Ecopark tenants so as to assist them in broadening their network in sourcing recyclables for treatment. General promotion on green procurement and importance of recycling would also be stepped up; and
- the Administration would also leverage on the EcoPark to disseminate information on proper recycling and cultivate a habit of recycling in daily lives of community members. Over 110 000 visitors had visited the EcoPark Visitor Centre since its opening in March 2010.

E. Treatment and disposal of municipal solid waste

Integrated waste management facility

45. With reference to paragraph 5.9 of the Audit Report, the Committee asked for the reasons for the postponement of the target of commissioning the integrated waste management facility ("IWMF") from mid-2010s to "2019 to 2022".

46. **Director of Environmental Protection** stated in her letter dated 21 December 2015 (*Appendix 8*) that:

- the Administration carried out a comprehensive site search exercise in 2006 to identify suitable sites for developing the first phase of IWMF and following the completion of the site search exercise in early 2008, Shek Kwu Chau site and the Tuen Mun Tsang Tsui Ash Lagoons site were found suitable as potential sites. In order to ascertain the suitability of these two potential sites, the Administration commissioned the detailed Engineering Investigation and

Environmental Impact Assessment studies for both sites in November 2008. The engineering investigation and environmental studies for the two potential sites for IW MF Phase 1 were completed in 2011;

- the long time taken for the development of IW MF Phase 1 was due to the need to obtain public consensus on related issues. Since February 2011, the Administration had met with over 2 500 stakeholders and about 60 groups/organizations, and attended 70 meetings to explain the need of the project and to address their queries on various aspects of the project. The Administration consulted the Advisory Council on the Environment on the findings of the feasibility study and the proposed moving grate incineration technology on 14 December 2009. At District Council level, the Administration attended the Islands District Council meetings on 21 February 2011, 20 February 2012 and 16 December 2013;
- since 2002, the Administration had attended over 10 EA Panel meetings to explain the need and justifications for the project. However, the Administration was not able to secure the support of EA Panel to submit the funding proposal to the Public Works Subcommittee ("PWSC") until 28 March 2014. The proposal was endorsed by PWSC on 27 May 2014 after five meetings. It was then approved by FC on 9 January 2015 after 10 meetings; and
- after obtaining funding approval, the Administration commenced the pre-qualification exercise in March 2015 to invite interested companies to make submission for pre-qualification. Preparation work for tender documents was now in progress. The Administration planned to invite tenders from the pre-qualified tenderers for the design, build and operate of the IW MF Phase 1 in 2016 and commission the facility in 2023.

Rising trend in MSW-disposal at landfills

47. According to Table 14 in paragraphs 5.14 and 5.15 of the Audit Report, notwithstanding the various actions taken by EPD in recent years to reduce the MSW generation and increasing the MSW recovery, the rising trend in both the total quantities and per-capita quantities of MSW disposed of at landfills from 2011 to 2014 was a cause of concern. The Committee asked why there was a rising trend in MSW-disposal at landfills.

48. **Director of Environmental Protection** stated in her letter dated 21 December 2015 (*Appendix 8*) that:

- to better understand the trend of MSW disposal rates, the Administration suggested that a longer term outlook on a per-capita basis should be adopted. The table at Chart 1 of *Appendix 8* could better illustrate the trend of MSW disposal rates over the past 10 years. The total MSW per-capita disposal rate actually was on a declining trend from 2005 to 2011 (from 1.38 kg/person/day in 2005 to 1.27 kg/person/day in 2011) but had since been on a slightly rising trend (1.35 kg/person/day in 2014). The declining trend could largely be attributed to the decline in domestic waste per-capita disposal rate (1.00 kg/person/day in 2005 to 0.89 kg/person/day in 2014). On the other hand, there had been a slightly rising trend in C&I waste per-capita disposal rate (from 0.37 kg/person/day in 2005 to 0.46 kg/person/day in 2014), offsetting the reduction in domestic waste;
- as economic growth generally increased the level of consumption and production activities which in turn might contribute to generating more waste, the rising trend of C&I waste disposal rate over the past 10 years was likely caused by increases in economic activities. As shown in Chart 2 of *Appendix 8*, the growth of per-capita-per-day C&I waste disposal rate over the last 10 years correlated normally with the growth of real Gross Domestic Product ("GDP"); and
- both the 2005 Policy Framework and the 2013 Blueprint recognized the importance of reducing waste at both the domestic and C&I sectors. Despite slight reduction of the overall MSW waste disposal rates over the past 10 years due to educational and policy waste measures, more efforts would need to be made if the Administration were to achieve the waste reduction target set out in the 2013 Blueprint. To this end, the Administration would vigorously pursue the various actions set out in the 2013 Blueprint and closely monitor progress of the various waste reduction measures in both the domestic and C&I sectors.

Estimation of the remaining serviceable lives of the landfills

49. According to paragraph 5.19 of the Audit Report, the historical MSW-disposal showed a weight-to-volume ratio of 1.24 tonnes of waste : 1 cubic meter ("m³") of landfill space. However, EPD had adopted a ratio of 1 tonne of

waste : 1 m³ of landfill space for estimating the remaining serviceable lives of the three landfills. The Committee asked why EPD had adopted this ratio in estimating the remaining serviceable lives of the landfills.

50. **Director of Environmental Protection** stated in her letter dated 21 December 2015 (*Appendix 8*) that construction waste represented about 50% of total waste disposed of at the landfills (1990-2005 average) prior to the implementation of construction waste disposal charging scheme in 2006, whilst thereafter the proportion was significantly reduced to about 25% (2006-2014 average). A ratio of 1.24 tonnes of waste : 1 m³ of landfill space was derived by the Audit based on historical information back to 1990s. However, inert construction waste (e.g. rock and concrete debris) had a higher weight-to-volume ratio as compared with ordinary MSW. In light of the significant reduction of inert construction waste requiring landfill disposal since 2006, EPD had adopted a more prudent and realistic assumption of a lower weight-to-volume ratio of 1 tonne of waste: 1 m³ in estimating the remaining serviceable lives of the three landfills.

51. As revealed in paragraph 5.20 of the Audit Report that in estimating the remaining serviceable lives of the three landfills, EPD had assumed that there would be growth in the MSW quantities, construction waste and special waste being disposed of at landfills in the coming years. The Committee queried the basis of such assumptions, and whether EPD had taken into account the effort made in recent years in reducing, recycling and recovery of MSW in arriving at such assumptions.

52. **Director of Environmental Protection** stated in her letter dated 21 December 2015 (*Appendix 8*) that:

- in estimating the remaining serviceable lives of the three landfills in the course of planning of the landfill extension projects in 2011-2012, EPD had made reference to the best available information at that time, including projected annual population growth (of 0.8% to 1%) from C&SD, forecasted GDP growth rate (of 4% per annum) from the Economic Analysis and Business Facilitation Unit and the latest information on annual increase in construction waste disposal at landfills (of 14.8% from 2009 to 2010), and adopted the assumptions that there would be a 2.5% annual growth rate of MSW and a 10% annual growth rate of construction waste respectively. Regarding the generation of special wastes, the Administration adopted a moderate annual growth rate of 5% in the planning exercise, having regard to its

comparative minor share of 8% of the total waste disposal at landfills; and

- in adopting the above assumptions on MSW and construction waste growth rates, EPD had taken into account the impacts of the promotional efforts on waste reduction and recycling. Nevertheless, as landfills were the last resort for waste disposal, the Administration had been prudent in the planning assumptions.

53. The Committee noted that Acting Secretary for the Environment had stated in her opening remark that "[LegCo] Members were provided with the information they requested, including those on the assumptions adopted in the estimation". In this connection, the Committee asked for the assumptions provided to Members when scrutinizing funding applications in 2014, and whether these assumptions included the assumptions in paragraph 5.19 of the Audit Report.

54. **Director of Environmental Protection** stated in her letter dated 21 December 2015 (*Appendix 8*) that:

- during the process of seeking funding approval from LegCo for the landfill extension projects, EPD provided information about the approach adopted in estimation of the remaining serviceable lives of landfills to EA Panel, PWSC and FC; and
- the detailed assumptions that EPD adopted in the projection were set out in paragraph 5.19 (a) to (d) of the Audit Report. These planning assumptions covered population growth, increases in economic activities, fluctuation of waste quantity, effectiveness of waste reduction measures, as well as information on landfill operation and landfill extension projects. In response to questions raised, factors taken into account in projecting the remaining capacity of the landfills were presented. The Administration had noted Audit's view that additional information on quantifiable data should also be presented in future funding applications and would do so in future applications.

55. In reply to the Committee's request, **Director of Environmental Protection** provided a table setting out the relevant information and discussion at LegCo about the approach adopted in estimation of remaining serviceable lives of the three landfills in her reply dated 21 December 2015 (*Appendix 8*).

56. According to the papers submitted by the Administration to EA Panel in 2008, 2012, 2013 and 2014, EPD had consistently changed the estimated remaining serviceable lives of the three landfills in Hong Kong. Under this circumstance, the Committee asked for the measures to improve the accuracy of such estimations, and the latest estimation of the remaining serviceable lives of the three landfills.

57. **Director of Environmental Protection** stated in her letter dated 21 December 2015 (*Appendix 8*) that the estimated serviceable lives of the landfills depended on a wide range of factors including population growth, level of economic and construction activities, implementation of waste reduction initiatives, provision of other upstream waste treatment facilities, development of landfill design, mode of landfill operation and implementation of landfill extension projects. As most of the contributing factors were dynamic in nature, the estimated serviceable lives of the landfills should be reviewed from time to time, having regard to the latest available information. This accounted for the necessary changes in the estimation upon review during the different stages of submissions to EA Panel from 2008 to 2014. With the funding approval of the LegCo on Southeast New Territories Landfill Extension and Northeast New Territories Landfill Extension in December 2014, it was anticipated that the increased serviceable lives of the three landfills would cope with the ultimate waste disposal need for the territories up to late 2020s. The estimated serviceable life of the West New Territories Landfill upon its extension would only be available upon completion of the relevant consultancy study.

Long-term planning study of waste disposal infrastructure

58. In reply to the Committee's enquiry regarding the details of the long-term planning study of waste disposal infrastructure commenced in September 2015 as mentioned by the Acting Secretary for the Environment in paragraph 16 of her opening remark at the public hearing on 7 December 2015, **Director of Environmental Protection** stated in her letter dated 21 December 2015 (*Appendix 8*) that:

- even upon the implementation of all waste reduction at source/reuse/recycling measures as set out in the 2013 Blueprint and "A Food Waste and Yard Waste Plan for Hong Kong (2014-2022)", there would still be a considerable amount of residual solid waste requiring disposal of at landfills. As the existing and currently planned waste management facilities would not be able to deal with all the waste sustainably in future, there was a need to carry out a study to identify additional strategic and regional waste treatment and bulk

waste transfer facilities for the management of solid waste to reduce reliance on landfills for waste disposal and to meet Hong Kong's longer term requirements;

- the Administration commissioned a study for planning of future waste management and transfer facilities in September 2015. The main objective of the study was to formulate, develop and produce a territory-wide plan and strategy on the provision of waste treatment and bulk waste transfer facilities for handling solid waste in an environmentally acceptable, sustainable and cost-effective manner to meet Hong Kong's sustainable development needs. The study would identify additional strategic and regional waste facilities required for bulk transfer and treatment of MSW and construction waste in line with smart city and circular economy concepts, draw up an outline action programme and develop the relevant planning guidelines for the identified waste facilities;
- the study would explore a variety of issues, including types and requirements, technology choices, optimal scales, spatial distribution, siting principles, site requirements, selection criteria, procurement options, potential broad geographical areas and indicative timing of the additional waste treatment and bulk waste transfer facilities; and
- according to the current programme, the study was expected to complete in the second quarter of 2017.

F. Way forward

59. In response to the Committee's question on the actions to be taken by the Administration to reduce MSW generation and increase MSW recovery, **Director of Environmental Protection** stated in her letter dated 21 December 2015 (*Appendix 8*) that the 2013 Blueprint analyzed the challenges and opportunities of waste management in Hong Kong, and mapped out a comprehensive strategy, targets, holistic policies and ten-year action plans for waste management with a view to tackling the waste problems in Hong Kong. The Administration endeavoured to implement the 2013 Blueprint and appeal to the public for support to achieve the targeted results. The Administration's major initiatives in the coming years included:

- driving behavioural change through mandatory schemes: Overseas experience had shown that implementing quantity-based charging

Government's efforts in managing municipal solid waste

could create financial incentive to drive changes in the public's waste-generating behaviour, thus achieving an overall reduction in waste disposal. The Administration was working towards implementing quantity-based charging in accordance with the views collected during the public engagement process. The Administration was now progressively implementing the PR schemes;

- continuing efforts on education and publicity: Environment and Conservation Fund would continue to fund projects by green groups and non-government organizations at community level to mobilize the local community to participate in waste reduction, source separation and clean recycling. The Administration would enhance its collaboration with government departments, district councils, schools, housing estates, property management companies, green groups and social services organizations in setting up more community recycling points to form a wider community recycling network to help develop the habit of clean recycling. The Administration was also progressively developing one community green station in each of the 18 districts, which would be run by non-profit making organizations to step up environmental education and enhance the logistics support in the collection of various low-value recyclables (such as electrical appliances, computers, plastic bottles, glass bottles, compact fluorescent lamps and rechargeable batteries) in the local community;
- promoting sustainable development of the recycling industry: The Administration had launched the \$1 billion Recycling Fund to assist recyclers to improve the collection network for recyclables, invest on machinery to lower the processing costs, develop value-adding recycled products, explore new market, obtain certification for the recycling process, attend training to enhance their skills and awareness of occupational safety and health, etc. The Administration would take heed of the advice and recommendations of the Advisory Committee on Recycling Fund, which comprised experts, academics and people with experience in business management and community service, as well as representatives from various business and industry associations, in operating the Fund. The Administration was stepping up co-operation with the industry to increase the operational capability of local recyclers and uplift the image of the industry, raise the standard of the occupational safety and health, enhance the training for current practitioners and attract more newcomers to join the industry;

Government's efforts in managing municipal solid waste

- promoting food waste reduction: The Administration would continue with the Food Wise Hong Kong Campaign to promote public awareness of the food waste problem in Hong Kong. The Administration would also encourage behavioral changes in various sectors of the community for reduction in food waste. The Administration would continue to give support to non-government organizations and encourage them to collect from business establishments, such as supermarkets, wet markets, restaurants, clubs, hotels, etc., food which was surplus but edible or was approaching but not reaching the expiry date for donation to the people in need; and
- strengthening infrastructural and land support: The Administration would continue to monitor the performance of tenants and usage of sites at the EcoPark; to encourage tenants to invest in advanced technologies and recycling processes; and to enhance the facilitation measures to address their operation needs at different stages of development. The Administration was conducting a study on land support required for continuable development of the recycling industry.

60. Estimation of the remaining serviceable lives of the three landfills was one of the most important factors in considering the Administration's funding applications for environmental projects, such as landfill extension, waste-to-energy facilities and organic waste treatment facilities, etc., by LegCo Members. During the scrutiny of landfill extension projects in 2014, some LegCo Members had repeatedly stressed their concerns that the Administration would slow down its efforts in putting forward policies and measures to reduce and recycle waste because of the provision of excessive waste disposal facilities, such as over-provision of landfill capacity and IWMF. As such, any variation in the estimation of the remaining serviceable lives of the three landfills would affect the overall waste management strategies and the priority and the timetable of implementing the relevant projects. In view of the inadequacies identified in the Audit Report on the estimation of the remaining serviceable lives of the three landfills and EPD's latest estimation, the Committee asked whether the Administration would develop a new blueprint setting out the revised waste management strategies, in particular whether additional resources and manpower would be allocated to enhancing the reduction and recycling of MSW.

61. **Director of Environmental Protection** stated in her letters dated 22 December 2015 (*Appendix 12*) and dated 11 January 2016 (*Appendix 13*) that:

- the underlying thinking of the 2013 Blueprint was to tackle waste problems from a resource re-circulation perspective. As part of waste reduction, the Administration encouraged the public to reuse and recycle as far as possible. Unavoidable waste would be turned into energy by modern technology while disposal at landfills would be the last resort. To measure the effectiveness of the comprehensive package of waste reduction measures set out in the 2013 Blueprint, the Administration had adopted a single target of reducing the MSW waste disposal rate on a per-capita basis by 40 percent by 2022. The accuracy and reliability of the waste statistics related to waste disposal was beyond doubt as they were based on factual weighbridge data recorded at entrances of waste treatment facilities. Other factors such as the fluctuations in waste recovery rates and the estimation of the serviceable lives of the three landfills would not diminish the impact of the various waste reduction measures, nor the waste reduction target set out in the 2013 Blueprint; and
- in the coming years, the Administration would endeavour to implement the 2013 Blueprint and appeal to the public for support to achieve the targeted results. While the 2013 Blueprint had only been implemented for a few years, the Administration had been constantly reviewing its waste management policies and initiatives to ensure they were responsive to new challenges posed by societal development, kept pace with public aspirations and were timely and adequate to address the needs of the industry.

G. Conclusions and recommendations

Overall comments

62. The Committee:

- expresses alarm and finds it unacceptable that despite the ambitious vision of the Administration in managing municipal solid waste ("MSW") as enshrined in the "Policy Framework for the Management of Municipal Solid Waste (2005-2014)" ("the 2005 Policy Framework"), the Environment Bureau ("ENB") and the Environmental Protection Department ("EPD") had demonstrated a lack of determination to execute the action plans in a professional and effective manner in order to achieve the targets set out in the 2005

Government's efforts in managing municipal solid waste

Policy Framework. As a result, the Administration had failed in meeting all the main waste management targets set out in the 2005 Policy Framework as follows:

- (a) MSW-generation quantities of 5.62 million tonnes in 2014 had exceeded the target of 5.25 million tonnes by 7%;
- (b) the published MSW-recovery rate was 37% in 2014, which had fallen short of the target level of 50% by 13%; and
- (c) the percentage of MSW disposed of at landfills was 63% in 2014 (3.57 million tonnes out of 5.62 million tonnes), which had exceeded the target level of 25% by 38%.

In addition, there have been substantial delays in the implementation of the policy tools proposed in the 2005 Policy Framework, including the producer responsibility schemes ("PR schemes"), the MSW charging scheme and the integrated waste management facility ("IWMF") project;

- finds it appalling and inexcusable that ENB and EPD had failed in their roles in compiling and providing useful, accurate and essential information to facilitate the discussion of the public and the Legislative Council ("LegCo") on waste management strategies and projects in a timely manner as evidenced by the following:
 - (a) despite that significant over-estimation of the MSW-generation quantities and MSW-recovery rates had existed for many years due to the negligence on the parts of ENB and EPD in including unknown quantities of import recyclables in the estimation, they had only since April 2014 adopted measures to improve the accuracy of these two key performance indicators on the Administration's actions in managing MSW. This had inevitably distorted the objective measurement of the effectiveness of the Administration's efforts to increase MSW recovery and recycling rates;
 - (b) ENB and EPD had consistently underestimated the remaining serviceable lives of the three landfills in their papers submitted to LegCo from 2008 to 2014 for funding applications for environmental infrastructure projects;

Government's efforts in managing municipal solid waste

- (c) the key performance indicators such as the MSW-generation quantities, the MSW-recovery rates, and the remaining serviceable lives of the three landfills are important factors in formulating waste management strategies and priorities by the Administration. They are also the key factors that LegCo Members had considered when the Administration submitted the funding applications for environmental infrastructure projects, such as landfill extensions, IWMF and the organic waste treatment facility ("OWTF"). The failure of ENB and EPD to compile more accurate estimations of these factors might lead to LegCo's decisions to approve waste management projects and prioritize the use of precious resources not in the best interests of Hong Kong; and
- (d) the accuracy of the statistics collected for evaluating the effectiveness of the measures on MSW reduction and recovery was in doubt given the following inadequacies: the method used by EPD to estimate the MSW recovery rate and the number of plastic shopping bags ("PSBs") bearing the features of supermarkets, convenience stores or personal-item stores ("pertinent PSBs") disposed of at landfills; the low response rate on the provision of statistics on the quantities of recyclables collected from waste-separation bins by participating housing estates and commercial and industrial ("C&I") buildings under the Source-separation Programmes;
- expresses serious disappointment that the current term Government has planned to conduct a study to review the need of implementing the PR schemes on three of the six products proposed by the previous term Government in the 2005 Policy Framework, i.e. vehicle tyres, packaging materials and rechargeable batteries. This policy shift might have disrupted the continuation of the policies on MSW management established by the previous term Government and affected the overall effectiveness of the policies. Moreover, ENB and EPD had not consulted LegCo or the public on the decision of the above policy shift, nor had they consulted LegCo or the public about their plan to introduce the PR scheme on a new product, i.e. plastic bottles;
- emphasizes that during the scrutiny of the funding applications for landfill extension projects in 2014, some LegCo Members had repeatedly stressed their concerns that the Administration would slow down its efforts in putting forward policies and measures to reduce and

Government's efforts in managing municipal solid waste

recycle waste because of the provision of excessive waste disposal facilities, such as over-provision of landfill capacity and IWMF. If more accurate estimations had been provided to LegCo, the funding applications for landfill extensions might have been deferred and the resources could have been used to enhancing the reduction and recycling of MSW or allocated to more urgent and useful community projects;

- notes that:

- (a) in 2013, the Administration updated the relevant policy tools and implementation strategy in the "Hong Kong Blueprint for Sustainable Use of Resources (2013-2022)" ("the 2013 Blueprint"). The 2013 Blueprint set a target of reducing the per-capita-per-day MSW disposal from 1.27 kg (using 2011 as the base year) to 1 kg or less by 2017, and to 0.8 kg or less by 2022, and laid down action plans for the implementation of the PR schemes on waste electrical and electronic equipment ("WEEE") and glass beverage bottles, Phase 2 of the PR schemes on PSBs and the MSW charging scheme;
- (b) according to the paper submitted by the Administration to LegCo Finance Committee in October 2014⁴, IWMF would be commissioned in 2022-2023; and
- (c) EPD, the Census and Statistics Department ("C&SD") and the Customs and Excise Department ("C&ED") have implemented enhancement measures in the collection of data of export recyclables since 2014. C&SD has also implemented the enhanced quality check procedures since April 2014 by selecting a sample of trade declarants of domestic exports of waste plastics⁵ for checking. According to the results of the enhanced quality check procedures on domestic exports of waste plastics, less than 1% of the domestic exports of waste plastics should be re-exports in the third quarter of 2015;

4 Please refer to the paper submitted by the Environment Bureau to the Finance Committee in October 2014 (Enclosure to LC Paper No. FCR(2014-15)34A).

5 According to paragraph 2.10 of the Audit Report, traders may import recyclables, mainly waste plastics, from overseas.

- urges Secretary for the Environment to:
 - (a) consider developing a new and realistic blueprint setting out the revised waste management strategies having regard to the under-estimation of the remaining serviceable lives of the three landfills as well as the significant over-estimation of the MSW-generation quantities and MSW-recovery rates by the Administration, and consider allocating additional resources and manpower to enhancing the reduction and recycling of MSW;
 - (b) strengthen efforts to closely monitor the trend of per-capita-per-day MSW disposal and the implementation of all major environmental projects, and take early corrective actions in future with a view to meeting the targets set out in the 2013 Blueprint or any new blueprint to be developed by the Administration;
 - (c) strengthen efforts to continue the implementation of long-term policies formulated by the previous terms of Government as appropriate with a view to achieving the targets set with the consensus of the community;
 - (d) provide LegCo, in future, with more accurate estimation of the remaining serviceable lives of the three landfills as well as the underlying assumptions in the estimation with more quantitative information; and
 - (e) report to and consult LegCo and the public, in future, in a timely manner on any significant changes to major initiatives in MSW management; and

- urges Director of Environmental Protection to:
 - (a) take measures to improve the accuracy of statistics collected for evaluating the effectiveness of MSW related programmes;
 - (b) closely monitor the trend of important estimation relating to MSW, in particular the key performance indicators on Government's actions in managing MSW, to identify any anomalies or areas of concern and take appropriate follow-up actions as early as possible; and

- (c) expedite the implementation of IWMP, PR schemes, MSW charging scheme and OWTF with a view to meeting the targets set out in the 2013 Blueprint or any new blueprint to be developed by the Administration.

Specific comments

63. The Committee:

Reduction in MSW

- expresses alarm and finds it unacceptable that:
 - (a) the system used by EPD in estimating the key performance indicators on Government's actions in managing MSW had been faulty. Owing to the negligence on the parts of ENB and EPD in including unknown quantities of import recyclables in the estimation, two key performance indicators, namely the MSW-generation quantities and MSW-recovery rates, had been over-estimated;
 - (b) although under the trade-declaration system, "domestic exports" comprised both import recyclables processed in Hong Kong for export and locally-generated recyclables for export, ENB and EPD had adopted "domestic export" quantities as the locally-generated recyclable quantities and had not compared the figures with those gathered from its annual waste-recovery surveys, resulting in over-estimation of the latter;
 - (c) mainly due to increases in the quantities of import recyclables from 2005 to 2010, the MSW-generation quantity had increased by 15% from 6.01 million tonnes to 6.93 million tonnes during the period, and the MSW-recovery rate from 43% to 52%. Likewise, mainly due to decreases in the quantities of import recyclables after 2010, the MSW-generation quantity had decreased to 5.49 million tonnes and the MSW-recovery rate to 37% in 2013;
 - (d) partly due to the over-estimation of the MSW-generation quantities, in 2011, Hong Kong's per-capita-per-day domestic

Government's efforts in managing municipal solid waste

MSW generation of 1.36 kg was much higher than those of Taipei City's 1.00 kg, Seoul City's 0.95 kg and Metro Tokyo's 0.77 kg;

- (e) notwithstanding that the over-estimation of the MSW-generation quantities and MSW-recovery rates had existed for many years, ENB and EPD have only since April 2014 adopted improvement measures together with C&SD and C&ED to collect additional data from exporters with a view to distinguishing between import recyclables processed for export and locally-generated recyclables for export which are both reported as "domestic exports" under the trade-declaration system;
- (f) the excess quantities of import plus locally-generated recyclables over export recyclables gave rise to concerns that some import recyclables might have been disposed of at local landfills;
- (g) as of January 2016, seven to nine years after the time targets for implementing the PR schemes on six products were set in the 2005 Policy Framework, the PR schemes on five products, namely WEEE, vehicle tyres, glass beverage bottles, packaging materials and rechargeable batteries, had not been implemented;
- (h) as of January 2016, while the implementation of MSW charging would contribute to 20% reduction in MSW generation which would significantly help reduce the quantity of MSW disposal at landfills, the MSW charging bill would only be submitted to LegCo in 2016-2017 legislative session, nine years after the time target of 2007 set out in the 2005 Policy Framework;
- (i) while ENB and EPD had informed LegCo of the reduction in the number of pertinent PSBs being disposed of at landfills during the implementation of Phase 1 of the PR scheme on PSBs from 2009 to 2013, they had not informed LegCo of the insignificant impact of the PSB scheme on landfills which had only contributed to 11 544 tonnes of annual reduction in MSW disposed of at landfills as against the total quantity of 3.48 million tonnes of MSW disposal in 2013;
- (j) the number of pertinent PSBs being disposed of at landfills based on EPD's landfill-survey results was significantly greater than that of PSBs distributed by registered retailers at registered

outlets based on their returns, giving rise to concerns that the former might have been significantly over-estimated; and

- (k) EPD did not have statistics on the number of PSBs belonging to registered outlets being disposed of at landfills before and after the implementation of Phase 1 of the PR scheme on PSBs;
- recommends that Secretary for the Environment and Director of Environmental Protection should, in implementing similar schemes in future, in addition to the reduction in the number of PSBs being disposed of at landfills, provide LegCo with and publish information on the reduction in weight of PSBs being disposed of at landfills before and after implementation of the scheme;
- notes that:
 - (a) Secretary for the Environment and Director of Environmental Protection have agreed with the Audit Commission ("Audit")'s recommendations in paragraphs 2.34 and 2.52 of the Director of Audit's Report ("Audit Report"); and
 - (b) Commissioner for Census and Statistics and Commissioner of Customs and Excise have agreed with Audit's recommendations in paragraph 2.34(a) of the Audit Report;

Recovery of MSW

- expresses grave dismay and finds it unacceptable that:
 - (a) while the Food and Environmental Hygiene Department incurred about \$9,000 for engaging contractors to collect a tonne of recyclables from waste-separation bins in public places for delivery to approved recyclers, due to the lack of reporting requirements in Government contracts for collecting recyclables from waste-separation bins, EPD did not have statistics on the quantities of recyclables collected from waste-separation bins which were disposed of at landfills due to contamination or other reasons;
 - (b) ENB and EPD had used Hong Kong's over-estimated MSW-recovery rate of 48% in 2011 to compare with those of

Government's efforts in managing municipal solid waste

Japan of 21% in 2010, Singapore of 48% in 2011, Taiwan of 52% in 2011 and South Korea of 61% in 2009;

- (c) in 2013 and 2014, only 26% and 12% respectively of waste plastics were recovered as compared with the recovery rates of 90% and 92% respectively for waste metals, and 61% and 58% respectively for waste paper for the two years; and
 - (d) in 2013, under EPD's Source-separation Programme, 51% of the 1 979 participating housing estates and 32% of the 860 participating C&I buildings did not provide EPD with statistics of the quantities of recyclables collected from waste-separation bins, thus adversely affecting assessment of the effectiveness of the programme;
- recommends that Secretary for the Environment and Director of Environmental Protection should take actions to ascertain and publish the quantities of recyclables collected from waste-separation bins which are disposed of at landfills due to contamination or other reasons;
 - notes that:
 - (a) Secretary for the Environment and Director of Environmental Protection have agreed with Audit's recommendations in paragraphs 3.20 and 3.39 of the Audit Report; and
 - (b) ENB and EPD plan to engage a consultant to conduct a review of the implementation of the Source-separation Programme and make recommendations to improve the programme, and will refine their promotion strategy in the light of the review;

Recycling of MSW

- expresses concern that:
 - (a) from 2011 to 2014, the actual throughput of Lot 1 of EcoPark, which commenced operation in January 2011, only accounted for 16% to 85% of the required throughput as specified in the tenancy;

Government's efforts in managing municipal solid waste

- (b) at Lot 3 of EcoPark, the tenant only commenced recycling operation 24 months after the time specified in the tenancy, and had twice suspended the operation for 20 months and 8 months respectively;
 - (c) at Lot 4 of EcoPark, up to August 2015, the tenant had not commenced recycling operation five years after the commencement date specified in the tenancy, but EPD had not repossessed the site for re-letting;
 - (d) at Lots 9, 10 and 14 of EcoPark, up to August 2015, the tenants had not commenced recycling operation 29 months after the time specified in the tenancies;
 - (e) from July 2012 to August 2015, EPD had permitted five EcoPark tenants, including four who were profit-making organizations, to use areas in vacant Lots 15 and 16 for storage purposes free of charge for 92 days to 897 days; and
 - (f) from 2015-2016 onwards, of the 33 short-term-tenancy sites occupying a total area of 47 105 square metres for exclusive use by the recycling industry, 18 sites occupying a total area of 15 967 square metres (34%) would be taken back for land sale or other uses;
- notes that Secretary for the Environment and Director of Environmental Protection have agreed with Audit's recommendations in paragraph 4.30 of the Audit Report;

Treatment and disposal of MSW

- finds it appalling and inexcusable that:
- (a) although the 2005 Policy Framework set a target of reducing the percentage of MSW disposed of at landfills from 60% in 2004 to 25% in 2014, more than 63% of MSW was disposed of at landfills in 2013 and 2014 respectively;
 - (b) notwithstanding various actions taken by EPD in recent years with a view to reducing MSW generation and increasing MSW recovery, the MSW quantity disposed of at landfills had increased by 8.8% from 3.28 million tonnes in 2011 to

Government's efforts in managing municipal solid waste

3.57 million tonnes in 2014, and the MSW per-capita-per-day quantity disposed of at landfills had increased by 6.3% from 1.27 kg in 2011 to 1.35 kg in 2014;

- (c) by comparing with Taipei city and South Korea, Hong Kong has only achieved about 14% decrease in the quantity of domestic/household MSW disposal over the past 20 years, while Taipei city and Seoul have achieved about 78% decrease and about 50% decrease in the quantity of domestic/household MSW disposal over the past 20 years and 18 years respectively⁶; and
 - (d) in informing LegCo in March 2012 that the three landfills would reach their capacities from 2014 to 2018, EPD did not provide LegCo with quantifiable information about the basis of estimation and the significant assumptions made in the estimation, such as using a conservative weight-to-volume ratio of 1 tonne of waste: 1 cubic metre of landfill space, and assuming annual growths in MSW and other waste being disposed of at landfills in spite of its stated efforts to reduce MSW generation and increase MSW recovery;
- notes that Secretary for the Environment and Director of Environmental Protection have agreed with Audit's recommendations in paragraph 5.21 of the Audit Report;

Way forward

- expresses serious concern that:
 - (a) with the implementation of the approved and proposed extension works, the three landfill sites would occupy a total area of 554 hectares of land, which is approximately the size of 550 standard football pitches. Notwithstanding this, Hong Kong's limited landfill space in the three landfills will be progressively used up in 8, 13 and 19 years respectively from present;
 - (b) owing to the scarcity of land, further extension of the three landfills or finding a place for developing a new landfill will be very difficult; and

⁶ Please refer to paragraph (e) of *Appendix 8* for the trend of domestic/household MSW disposal in the three places provided by EPD.

- (c) despite the fact that a proposal for providing a waste-to-energy facility for MSW treatment was made as early as 1998, such facility would only be provided in 2023, and it would only then treat 1.1 million tonnes of MSW a year as against the total quantity of 3.57 million tonnes of MSW disposed of at landfills in 2014; and
- notes that Secretary for the Environment and Director of Environmental Protection have agreed with Audit's recommendations in paragraph 6.15 of the Audit Report.

Follow-up action

64. The Committee wishes to be kept informed of the progress made in implementing the various recommendations made by the Committee and Audit.