

REDUCTION AND RECYCLING OF FOOD WASTE

Executive Summary

1. In 2013, Hong Kong generated 1.36 million tonnes of food waste, of which 1.33 million tonnes (98%) were disposed of at landfills, accounting for 38% of the 3.48 million tonnes of municipal solid waste (MSW) being disposed of at the three landfills in Hong Kong. The remaining 0.03 million tonnes (2%) were recycled mainly as fertiliser. In terms of weight, the quantity of the food waste disposed of at landfills every day was equivalent to that of about 250 double-decker buses.

2. As the executive arm of the Environment Bureau (ENB), the Environmental Protection Department (EPD) is responsible for implementing waste management policies and strategies. In December 2005, the 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 minimisation; reuse, recovery and recycling; and bulk reduction and disposal of MSW which included food waste and yard waste. In May 2013, the 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 quantities. In February 2014, the ENB published “A Food Waste and Yard Waste Plan for Hong Kong (2014-2022)” (the 2014 Food Waste Plan) which set out a target to reduce food-waste disposal at landfills by 40% by 2022, using 2011 as the base year. In 2014-15, the estimated recurrent expenditure of the EPD’s waste (including food waste) management programme was \$2,049 million. The estimated operation cost (including collection and transfer cost) of disposing of a tonne of MSW (including food waste) was \$520. The Audit Commission (Audit) has recently conducted a review to examine the reduction and recycling of food waste by the Government with a view to identifying areas for improvement.

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3. *Timely actions not taken to address the food-waste disposal problem.*

Food-waste disposal at landfills had increased from 3,227 tonnes per day (tpd) in 2004 to 3,648 tpd in 2013, representing a 13% increase. The disposal of large quantities of food waste at landfills in the past years had dwindled the limited and precious landfill space, and generated landfill gas and leachate that exacerbated environmental problems. Notwithstanding that the ENB set a target in the 2005 Policy Framework of reducing the quantity of MSW generation by 1% per annum up to 2014, using 2003 as the base year, the Government had taken piecemeal actions in the past years to find alternative ways for disposing of food waste. In 2014, the ENB promulgated measures and set a specific target of reducing food-waste disposal at landfills by 40% by 2022 (paras. 1.13, 2.6(a), 2.11, 2.12, 2.14 and 4.5).

4. *Many government departments invited but not signing the Food Wise Charter (FW Charter).*

In 2011, about 3,600 tpd of food waste were disposed of at landfills. In order to achieve a 40% reduction in food-waste disposal at landfills by 2022 (using 2011 as the base year), the 2014 Food Waste Plan promulgated two major food-waste-reduction measures comprising the introduction of an MSW charging scheme and the Food Wise Hong Kong Campaign (FW Campaign) which were projected to achieve 324 tpd and 360 tpd of food-waste reductions respectively. In May 2013, for the purposes of encouraging public participation in and soliciting public support for food-waste reduction programmes, the EPD introduced the FW Charter under the FW Campaign. Signees of the FW Charter pledged to implement food-waste reduction measures specified by the EPD. In addition to private businesses and organisations, from May to October 2013, the EPD had invited 12 government departments to sign the FW Charter. However, up to June 2015, only four of the 12 government departments had signed the FW Charter, at variance with the FW Campaign objective on coordinating efforts within the Government and public institutions to lead by example in food-waste reduction. After commencement of this review in May 2015, six of the remaining eight government departments had signed the FW Charter from July to October 2015 (paras. 2.2, 2.17(b), 2.19, 2.20, 2.22 and 2.38(b)).

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5. ***Some Correctional Services Department (CSD) institutions and Hospital Authority (HA) hospitals generating relatively high quantities of food waste.***

According to surveys conducted by the CSD and the HA in response to Audit's requests, the per-person-in-custody food-waste quantities of the 29 CSD institutions in August 2015 ranged from 0.02 kilogram (kg) to 1.61 kg per day, with an average of 0.11 kg per day, and the per-in-patient food-waste quantities of the 38 HA hospitals in July/August 2015 ranged from 0.06 kg to 0.58 kg per day, with an average of 0.31 kg per day. These variances of food-waste quantities show that some CSD institutions and HA hospitals might have adopted good food-waste-reduction practices thereby achieving low food-waste generation, whereas there is room for improvement for some other CSD institutions and HA hospitals to reduce food-waste generation (paras. 2.45 to 2.48).

6. ***Some schools not adopting green lunch practice.***

The EPD estimated that, in 2010, some 550,000 whole-day school students took lunch at school and they generated 100 tonnes of food waste and discarded 250,000 disposable lunch boxes every day which were disposed of at landfills. According to the ENB, students taking lunch through the on-site meal portioning arrangement would help reduce food waste by up to 50% because, under this arrangement, students would be conscious in making food choices and in reducing food wastage. However, according to the EPD's latest survey conducted in 2010, only 12% of students taking lunch at school took lunch through the on-site meal portioning arrangement. The survey also found 46% of students taking lunch at school used disposable containers (which would be disposed of at landfills after use) (paras. 2.53, 2.60, 2.62, 2.63, 2.66 and 2.67).

7. ***Some new schools not adopting on-site meal portioning.***

As stated in the 2009-10 Policy Address, the standard design of new schools would cater for on-site meal portioning. However, Audit noted that, up to June 2015, four of the six new schools with construction works completed from July 2011 to October 2012 which had been installed with related facilities had not adopted the on-site meal portioning arrangement (paras. 2.81 and 2.83).

Recycling of food waste

8. The 2014 Food Waste Plan promulgated four measures for increasing food-waste recycling, comprising the provision of a private food-waste recycling facility at EcoPark in Tuen Mun by end 2015, Organic Waste Treatment Facility (OWTF) Phase 1 in North Lantau by mid-2016, OWTF Phase 2 in Sheung Shui by end 2018 and OWTF Phase 3 in Yuen Long by early 2021. Compared to the 3,600 tpd of food waste being disposed of at landfills in 2011, the EPD estimated that the EcoPark facility would treat 100 tpd of food waste, and OWTF Phases 1, 2 and 3 would treat 200 tpd, 300 tpd and 300 tpd of food waste respectively. Food-waste recycling at the EcoPark facility commenced operation in May 2015 (paras. 1.13(c), 3.2 and 3.16).

9. *Actual treatment quantity of a pilot plant significantly lower than that reported.* In August 2008, a pilot composting plant for food-waste treatment at Kowloon Bay (Pilot Plant) was completed at a cost of \$16.2 million. The objectives of the Pilot Plant were to gather useful information and local experience on collection and treatment of food waste, and to evaluate the quality and market potential of compost products generated by the Plant. In April 2009 and March 2010, the EPD informed the Panel on Environmental Affairs (EA Panel) of the Legislative Council (LegCo) that the Pilot Plant would be capable of receiving up to 4 tpd of source-separated food waste from commercial and industrial (C&I) premises. However, Audit examination revealed that, from August 2008 to June 2015, the average quantity of food waste treated at the Pilot Plant was only 0.89 tpd, representing only 22% of the 4-tpd capacity reported to the EA Panel in 2009 and 2010 (paras. 3.6, 3.7 and 3.9).

10. Furthermore, in September 2015, the EPD informed Audit that the treatment capacity of the Pilot Plant should be 1.37 tpd instead of 4 tpd of food waste. However, Audit noted that, in the first half of 2015, the average quantity of food waste treated at the Pilot Plant was only 0.65 tpd, representing only 47% of the updated treatment capacity of 1.37 tpd of the Plant (para. 3.12).

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11. ***Significant under-estimation of project cost of OWTF Phase 1 in 2010.***

As stated in the project profile of OWTF Phase 1 in October 2007, the EPD had planned to commence tendering for the project in July 2010 with a view to commissioning the facility in March 2013. However, the tender exercise for the project carried out in 2011 was cancelled in the public interest. Audit noted that the price of the lowest tender was significantly higher than the Government's earmarked funding at that time for the proposed works, which had been based on the EPD's project estimate made in late 2009. The EPD informed the EA Panel in November 2010 that the project estimate was \$489 million. Audit examination revealed that some cost components had been omitted or significantly under-estimated in the project estimate of \$489 million, leading to significant under-estimation of the project cost made in 2010 (paras. 3.20, 3.22(a), 3.23, 3.28(a) and 3.32).

12. In February 2013, the EPD carried out a re-tender exercise for the project. In October 2014, the Finance Committee of LegCo approved funding of \$1,589.2 million for the project. In December 2014, the EPD awarded a design-build-operate contract for the project. The works commenced in December 2014 and were scheduled for completion in March 2017. Partly owing to the cancellation of the tender exercise in 2011 and re-tendering of the project in 2013, the commissioning of OWTF Phase 1 would be postponed by four years, and during the period a substantial quantity of food waste would be disposed of at landfills instead of being treated by the facility. OWTF Phase 1 was designed to treat 200 tpd or 73,000 tonnes of food waste a year (paras. 3.18, 3.19, 3.26 and 3.31).

13. ***Small number of households in public rental housing (PRH) estates participating in food-waste recycling trial schemes.***

Audit noted that the Housing Department invited 52,000 (77%) of the total 67,600 households in 14 PRH estates to participate in food-waste-recycling trial schemes, under which most of the food waste collected would be delivered to a private food-waste-recycling plant for recycling into fish feed. In the event, only 6.2% of the 52,000 households participated in the schemes. In mid-2014, the schemes implemented in 13 of the 14 PRH estates ceased (paras. 3.44, 3.45 and 3.48).

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14. *Low utilisation of food-waste recycling facilities in private housing estates.* From November 2011 to June 2015, the Environment and Conservation Fund had approved funding totalling \$41.2 million for 40 private housing estates for implementing two-year food-waste recycling projects, partly for leasing on-site food-waste treatment machines. As of June 2015, 16 of the 40 estates had commenced and some had completed the projects. Audit noted that only 4.6% of the 43,091 households residing in the 16 estates had participated in the projects, which was lower than the EPD's estimated participation rate of 10%. Moreover, while a food-waste treatment machine installed in each estate could treat 100 kg of food waste a day, each of the 16 estates on average only provided 42.7 kg of daily food waste for treatment (paras. 3.53(a), 3.57 to 3.60).

Way forward

15. It is a cause for concern that the quantity of food waste disposed of at landfills had increased from 1.18 million tonnes in 2004 to 1.33 million tonnes in 2013 (a 13% increase). Moreover, Hong Kong's per-capita domestic food waste of 0.37 kg per day was 85% higher than the 0.2 kg each of Taipei and Seoul. In view of the serious problems caused by the disposal of significant quantity of food waste at landfills and the piecemeal government actions before 2014 to address this problem (see para. 3), the ENB/EPD need to strengthen efforts and expedite actions to tackle the problems encountered in implementing the various measures promulgated in the 2014 Food Waste Plan (paras. 4.4 and 4.5).

16. As OWTF Phases 1 to 3 will help reduce disposal of 0.3 million tonnes of food waste at landfills a year (representing 23% of the 1.33 million tonnes of food waste disposal in 2013), it is of utmost importance that the facilities could be provided according to the EPD's timeframe. The ENB/EPD also need to strengthen efforts on implementing trial schemes for separating and collecting food waste from the domestic and the C&I sectors to gain experience and inculcate the general public's behavioural changes in waste disposal, without which the effectiveness of the implementation of OWTFs could be undermined (paras. 1.3, 4.6 and 4.7).

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Audit recommendations

17. Audit recommendations are made in the respective sections of this Audit Report. Only the key ones are highlighted in this Executive Summary. Audit has *recommended* that the Government/the HA should:

Reduction in food waste

- (a) be vigilant in monitoring the generation and disposal of food waste against the targets and take early corrective actions in future (para. 2.37(a));
- (b) remind government departments of the need to demonstrate full support to the Government's policy on food-waste reduction by signing the FW Charter (para. 2.37(b));
- (c) conduct reviews of food-waste quantities of CSD institutions and HA hospitals with a view to identifying areas for improvement (paras. 2.49(a) and 2.50(a));
- (d) periodically conduct surveys on lunch practices of all whole-day schools and encourage schools to adopt on-site meal portioning as far as possible (para. 2.88(a) and (d));
- (e) take measures to ensure that all new schools installed with related facilities adopt on-site meal portioning (para. 2.90(b));

Recycling of food waste

- (f) take measures to provide clear, relevant and important information to LegCo in future (para. 3.13(a));
- (g) strengthen efforts to encourage more C&I premises to participate in food-waste recycling schemes (para. 3.13(b));

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- (h) endeavour to make a reasonable cost estimate in implementing a works project in future so that the Government can earmark sufficient funding for the project (para. 3.39(a)(ii));
- (i) invite as many households as possible, and strengthen efforts to encourage households, to participate in food-waste recycling schemes in PRH estates in future (para. 3.50(a)(i) and (ii));
- (j) consider providing support and strengthen efforts to encourage participating private estates to invite more households to participate in food-waste recycling schemes in future (para. 3.67(a)(i));

Way forward

- (k) strengthen efforts to ensure that OWTF Phase 1 would commence operation by 2017 and, subject to resource availability, commission OWTF Phases 2 and 3 by 2020 and 2022 respectively (para. 4.11(b)); and
- (l) map out and implement an effective system for separating, collecting and transporting food waste from the C&I and domestic sectors to OWTFs for treatment (para. 4.11(d)(ii)).

Response from the Government and the Hospital Authority

18. The Government and the HA agree with the audit recommendations.