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立法會工務小組委員會

有關有機資源回收中心第二期

現附上工務小組委員會於 2018 年 11 月 28 日的會議上要求政府就有機資源回收中心第二期的問題提交的回應及補充文件。

環境保護署署長

（徐浩光 代行）

2019 年 2 月 1 日

Annex 1

Government's response to the questions on the Organic Resources Recovery Centre Phase 2 raised at the meeting of Public Works Sub-committee held on 28 November 2018

(1)	**At the request of the Chairman and Hon Tony TSE Wai-chuen, the Government shall provide supplementary information explaining what performance indicators are in place to assess the operating performance of the contractor of the Organic Resources Recovery Centre Phase 2 (ORRC2); and whether there are mechanisms and penalties under the contract to handle situations where the operating performance of the contractor is found to be unsatisfactory.**
Reply:	It is stipulated in the tender documents of the ORRC2 that the contractor shall ensure proper operation of the overall facilities of the ORRC2 during the operational period in the future and shall strictly comply with various technical, environmental and operational performance requirements as well as the relevant performance indicators, which mainly include the following: ● To operate the facilities of the ORRC2 24 hours daily and operate the waste reception facilities between 0800 to 2200 daily to receive up to 300 tonnes food waste; ● To ensure the compost produced shall comply with the relevant quality standards; ● To produce, in compliance with the above requirements, sufficient energy to meet the internal need for the facilities of the ORRC2 and export any surplus energy as electricity or biogas; ● To prohibit burning of biogas produced under normal operation; ● To repair and carry out maintenance works for the safety device system within three days; ● To comply with the relevant occupational safety and health legislations and practices so as to avoid related accidents; ● To comply with the conditions of the environmental permit, the requirements on effluent and air emission quality, and environmental monitoring, etc.; and ● To comply with other operational requirements such as site cleanliness and housekeeping, relevant legislations, life saving and fire fighting equipment, maintenance and inventory record, etc. To address the unsatisfactory performance of the contractor during operation, the following relevant mechanisms and penalties have been included in the contract terms: ● **Suspension of operation** – If ORRC2 fails to operate on any days, the Government will deduct the corresponding operational fees for that period;

	● **Operational requirements** – If the contractor fails to comply with any or all of the operational requirements in the contract for any month, the Government will deduct the relevant fees from the operational fees of the month on a pro rata basis; ● **Environmental requirements** – If the contractor fails to comply with any or all of the environmental requirements in the contract for any month, the Government will deduct the relevant fees from the operational fees of the month on a pro rata basis; ● The Government can terminate the contract according to the contractual procedures if necessary. Apart from enforcing the contractual terms, we will monitor the contractor's performance during operation according to the Government's requirements on public works projects, and assess the contractor's performance at least once every 6 months. If the contractor's underperformance persists, the Government will take appropriate disciplinary actions according to the seriousness of the incidents, such as termination of the contract, or even suspension of the contractor's eligibility to tender for other government projects, etc.
(2)	**At the request of Hon CHEUNG Yu-yan, Tommy and Hon CHU Hoi-dick, the Government shall provide a comparison between the total capital cost with major breakdown figures of the proposed ORRC2 (that is, $2,453 million in MOD prices) and those of the food waste treatment facilities in the Mainland and in other countries, and explain the reasons for the higher/lower capital cost of the ORRC2 than similar facilities in the Mainland and in other countries.**
Reply:	We have gathered the information as set out below from the Internet. However, we could not acquire specific details of the facilities listed below such as the treatment technologies, food waste collection and pre-treatment processes adopted by the facilities; the details of the construction projects such as project scope, design and operational requirements, environmental monitoring and emission standards; and the cost breakdown of the items in the treatment facilities, etc. Moreover, as the food waste treatment facilities in other places may involve different geographical settings, treatment technologies, organic matters (such as livestock waste or yard waste), food waste pre-treatment processes, equipment and construction costs, and/or the need to meet different environmental monitoring requirements / discharge standards, most of these facilities are for reference only and cannot be directly compared with the proposed ORRC2. The information gathered from the Internet are as follows : ● **Food waste treatment facilities in other countries :** The wet anaerobic digestion facility at Toyohashi City, Aichi Prefecture, which

came into operation in 2017 (adopting the same technology as the ORRC Phase1 (O•PARK1)), processes 59 tonnes of food waste plus a similar amount of sewage sludge solids daily. Its construction cost was 14 billion Japanese Yen (approximately HK$ 1 billion).

Also, a facility at Stausebach, Kirchhain, Germany utilizing a combined dry and wet anaerobic digestion technology to treat 100 tonnes of food waste daily commenced operation in 2014. The anaerobic digestion system alone cost 12 million Euro (approximately HK$ 100 million).

- **Food waste treatment facilities in the Mainland :**
  We have gathered from the Internet some information about the food waste treatment facilities in the Mainland, including the Haiyan Green Energy Project – Integrated Food Waste Treatment Project (Phase One) (海鹽綠能環保項目-餐廚垃圾綜合處理項目(一期)), the Maanshan Food Waste Treatment Project (馬鞍山市餐廚垃圾處理項目), the Jiangsu Suzhou Industrial Park Kitchen and Yard Waste Treatment Project Phase One (江蘇蘇州工業園區餐廚及園林綠化垃圾處理一期工程項目), and the Ningbo Food Waste Treatment Plant Phase One (寧波市廚餘垃圾處理廠一期). The treatment capacities of these facilities range from 75 tonnes to 400 tonnes per day and the capital costs are from RMB 65 million to RMB 300 million.

Owing to the huge differences in the prices of building materials, transportation costs, wage levels of engineering design professionals and construction personnel, etc. between different provinces and cities in the Mainland and Hong Kong, the construction costs of the food waste treatment facilities in the two places will also be different. Moreover, the sites identified for developing food waste treatment facilities in the Mainland are generally more spacious with less geographical constraints, and are far from residential areas. In contrast, Hong Kong is a small place with a large population, and there are very limited locations suitable for developing food waste treatment facilities. The site identified for the ORRC2 is the former Sha Ling Livestock Waste Composting Plant which is topographically pot-shaped and located on a hill. The future contractor will have to carry out slope reinforcement and maintenance works on four slopes amount to 1 300 square meters. In addition, the site has only one access point, imposing great limitations on the road link; and there are also residential buildings and government facilities nearby. The contractor has to overcome various engineering, operational and geographical difficulties, as well as to carry out effective environmental mitigation measures, and these difficulties and limitations will lead to higher construction costs.

	In view of the above reasons, we opine that it is inappropriate to compare the capital cost of the ORRC2 project with those food waste treatment facilities in other places in terms of the total amount and major breakdown figures. Nonetheless, if we compare the estimated capital cost of the O▪PARK1 with a daily treatment capacity of 200 tonnes to that of the ORRC2 with a daily treatment capacity of 300 tonnes, i.e. $1,589.2 million and $2,453 million (in MOD prices) respectively, or $435 and $448 respectively for each tonne of food waste, both prices are of similar order. The project estimate of the ORRC2 has been reviewed by the Project Cost Management Office (PCMO) of the Development Bureau. Having compared against the cost of the O▪PARK 1, and noting that the Environmental Protection Department (EPD) has adopted parallel tendering in order to obtain a more realistic estimate, PCMO opined that the estimate of the ORRC2 was at an acceptable market level. In accordance with the Government's established tendering procedure, we have invited tenders through a transparent, fair and open bidding process so as to obtain a competitive tender that can meet the local requirements for the treatment of the food waste in Hong Kong.
(3)	**At the request of Hon CHAN Chi-chuen, the Government shall provide a summary of the tender assessment criteria in the marking schemes of other works of similar scale under the Environment Bureau, specifying the evaluation weighting assigned to "Past Performance" (including site safety records, etc.) of tenderers. The Government shall also explain whether 2.1% weighting assigned to "Past Performance" in the marking scheme for the ORRC2 is on the low side.**
Reply:	For major public works with contract values over HK$ 100 million, the tender assessment criteria in the marking schemes have to be considered and approved by the Central Tender Board. The Environment Bureau awarded 3 major works projects as Design-Build-Operate contracts in the past five years (which included waste treatment facilities of the EPD and sewage treatment facilities of the Drainage Services Department). The weightings assigned to "Past Performance" (including workmanship, operation, progress, site safety, safety rating, general obligations, environmental monitoring and pollution control, attitude to claims, and records against convictions under the Immigration Ordinance, Employment Ordinance or other site safety, environmental related and road opening offences) in their respective marking schemes are listed below : See table below

Works project :	Weighting assigned to "Past Performance" in the marking scheme

O·PARK1	1.8%
Integrated Waste Management Facilities (IWMF) Phase 1	1.2%
San Wai Sewage Treatment Works Phase 1	5.0%

As both O·PARK 1 and IWMF are new facilities with new technologies and there is no past similar project for comparison, the weightings assigned to "Past Performance" of their marking schemes would therefore be lower than that of the sewage treatment works. Taking the examples of two recent major waste treatment facilities of the EPD, namely the ORRC1 and the IWMF Phase 1, the weighting assigned to "Past Performance" in the tender evaluation for the ORRC2 at 2.1% is not low.

(4) **At the request of Hon WU Chi-wai, the Government shall provide supplementary information on the cost-effectiveness of the two arrangements for the biogas generated by the ORRC2, namely using the biogas generated to produce electricity for the use of the ORRC2 and selling the surplus electricity; or selling all biogas generated and purchasing electricity to meet the demand of the ORRC2, using the O·PARK1 as the benchmark.**

Reply: With reference to the operation of the O·PARK1, we expect that about 30 000 cubic metres of biogas can be generated daily upon full operation of the ORRC2. The combined heat and power (CHP) system (about $190 million) at the ORRC2 will convert about one third of the biogas into electricity and heat for meeting the internal demand. As for the surplus biogas, the ORRC2 can convert it into electricity, which amounts to about 24 million kilowatt-hours annually, and sell it to the power companies at fuel cost. Alternatively, the surplus biogas can be sold to the energy companies as methane. If the surplus biogas is converted into electricity and sold to the power companies, the ORRC2 can receive about $7 million annually based on the current fuel cost per kilowatt-hour of electricity. As for biogas selling, the relevant information is not available as we do not have the selling price of biogas at present.

If all 30 000 cubic metres of biogas generated are sold, then the ORRC2 has to purchase about 14.8 million kilowatt-hours of electricity from the power companies annually for meeting the internal demand (including about 6.4 million kilowatt-hours of electricity for daily operation and 8.4 million kilowatt-hours of electricity for heating purpose), and the estimated electricity tariff is about $13 million annually (based on the current electricity tariff). Furthermore, the ORRC2 needs to purchase additional biogas upgrading system in order to sell all biogas, and a system for turning electricity into heat to satisfy the ORRC2's internal demand. Although we do not have the costs of

	these additional systems, their costs would not be cheap. If we choose to meet the ORRC2's internal need for electricity and heat by spending one third of the biogas generated through a CHP unit and sell the remaining two third of biogas as methane, it is necessary to install a backup CHP unit so as to ensure normal operation as the ORRC2 cannot rely on only one CHP. It is roughly estimated that the cost of installing a CHP plus a backup unit will account for about 60% of the total investment of $190 million which represents 3 CHP units at the ORRC2. Regarding energy efficiency, CHP units using biogas can achieve energy efficiency of up to 86%, whereas the energy efficiency of generating electricity using natural gas at the Black Point Power Station of the power company is 45%, and that for producing heat by burning town gas is about 52%. It is therefore more energy efficient to use CHP units to convert some of the biogas into electricity and heat for meeting the ORRC2's internal demand. As for carbon emissions, the ORRC2 can help reducing carbon emissions in Hong Kong. Comparing to the landfill disposal of food waste, the operation of the ORRC2 can bring about an overall reduction of about 67 000 tonnes of carbon emissions. If all the biogas generated is sold and electricity is purchased to meet the internal need of the ORRC2, the carbon emission reduction benefit will be reduced by about 6 000 tonnes of carbon emissions, which is equivalent to the annual carbon emissions of about 2 000 private cars. Taking into consideration the analyses above, we are of the view that the installation of CHP units at the ORRC2 to provide heat and electricity is more cost-effective and environmentally friendly.

Environmental Protection Department
February 2019

Annex 2

PUBLIC WORKS SUBCOMMITTEE
OF FINANCE COMMITTEE

Supplementary Note

HEAD 705 – CIVIL ENGINEERING
Environmental Protection – Refuse Disposal
173DR – Organic Resources Recovery Centre Phase 2

At the meeting of the Public Works Subcommittee on 28 November 2018, Members requested the Government to provide a roadmap on the overall planning of food waste recycling. This paper provides the relevant information for Members' reference.

Introduction

2. In 2017, 3 662 tonnes of food waste were disposed of at landfills in Hong Kong each day, accounting for about one-third of our municipal solid waste. Recycling of food waste will not only significantly relieve the burden on landfills but also alleviate the odour problem and reduce greenhouse gas emissions. The Government has attached great importance to promoting food waste reduction, recovery and recycling, with the Environment Bureau setting out four strategies in the "A Food Waste & Yard Waste Plan for Hong Kong 2014 – 2022" (Food Waste Plan) to tackle food waste, namely reduction at source, reuse and donation, recyclable collection and turning food waste to energy.

3. One of the important backbone strategies under the Food Waste Plan is the setting up of a network of Organic Resources Recovery Centres (ORRCs), which will make use of advanced technology to recycle unavoidable food waste into renewable energy, i.e. turning waste into energy, thereby reducing greenhouse gas emissions and mitigating global climate change. Under the Municipal Solid Waste Charging Scheme, to enable waste recycling and reduction as well as facilitate charging, the Government plans to launch a pilot scheme to provide free food waste collection service to the commercial and industrial (C&I) sector, and ultimately extend the free food waste collection service to all sectors in Hong Kong, including domestic food waste, subject to the experience gained from the pilot scheme and the progress on developing food waste treatment and recycling centres in Hong Kong. One of the key elements is to have the network of the ORRCs ready on time so as to provide the

necessary food waste treatment capacity.

Development of a Network of Organic Resources Recovery Centres

4. Completed and commissioned in July 2018, the ORRC Phase 1 (O·PARK1) in Siu Ho Wan of Lantau can ultimately treat 200 tonnes food waste daily. By adopting anaerobic digestion and composting technologies, the O·PARK1 can produce about 20 000 cubic metres of biogas daily which is a renewable energy. In addition to providing electricity and heat for the facilities in the O·PARK1, the surplus biogas can be used for generation of electricity for uploading to the power grids. It is estimated that about 14 million kWh of surplus electricity can be exported each year (equivalent to the electricity consumption of about 3 000 households). The O·PARK1 will also produce about 6 500 tonnes of compost annually.

5. The Environmental Protection Department (EPD) is currently seeking funding approval from the Legislative Council (LegCo) for detailed planning and construction works for the ORRC Phase 2 (ORRC2) in Sha Ling of the North District. If the funding is approved and the contract is awarded in the first half of 2019, the ORRC2 is expected to be commissioned in 2022 the earliest. The ORRC2 will adopt anaerobic digestion and composting technologies used in the O·PARK1, with a daily food waste treatment capacity of 300 tonnes. It is estimated that the ORRC2 can produce about 30 000 cubic metres of biogas daily which is a renewable energy. Apart from providing electricity and heat for its own facilities, the surplus biogas can be converted to about 5 million cubic metres of bio-methane or 24 million kWh electricity annually (equivalent to the electricity consumption of around 5 000 households). We will supply the surplus electricity to nearby government facilities as far as possible. The remaining surplus biogas will either be converted to bio-methane for use as town gas or used for electricity generation for uploading to the power grids of the power companies. The ORRC2 will also produce about 10 000 tonnes of compost annually.

6. The EPD is conducting an engineering feasibility study and an Environmental Impact Assessment (EIA) for the ORRC Phase 3 (ORRC3) in Shek Kong of Yuen Long. The main focuses include examining the feasibility of adopting various types of treatment technologies, proposals of the use of renewable energy, as well as various modes of design, construction and operation. Taking into consideration the operation of the O·PARK1 and the ORRC2, the consultant will also re-examine whether the ORRC3 should continue to produce compost. We expect that the engineering feasibility study and the EIA will be completed in 2021, and the ORRC3 is scheduled for commissioning in 2026 with a daily food waste treatment capacity of

300 tonnes. We will continue to identify sites for developing more facilities related to food waste recycling. We will also work with the Drainage Services Department (DSD) to examine the use of existing and planned sewage treatment works (STW) to take forward the "food waste/sewage sludge anaerobic co-digestion" technology in order to expedite the enhancement of the overall food waste recycling capacity in Hong Kong.

Food Waste/Sewage Sludge Anaerobic Co-digestion

7. The first "food waste/sewage sludge anaerobic co-digestion" trial scheme (Trial Scheme) will be carried out in Tai Po to confirm the feasibility of this technology in local application. Under the Trial Scheme, the EPD will build food waste pre-treatment facilities at the Shuen Wan Leachate Pre-treatment Works near the Tai Po STW. The pre-treated food waste pulp will then be pumped to the sewage sludge anaerobic digestion system at the Tai Po STW for co-digestion. The food waste pre-treatment facilities are scheduled for commissioning in the first half of this year and can process about 50 tonnes of food waste per day. The Government will also extend the Trial Scheme to cover the Sha Tin STW for commissioning in 2022 with a daily food waste treatment capacity of about 50 tonnes.

8. We are working in parallel with the DSD to examine the engineering feasibility of enhancing the sewage sludge treatment facilities at STW for food waste recycling, including upgrading the anaerobic digestion system of the Tai Po STW during its expansion project in future so as to process more food waste, as well as extending the application of the technology to other STW where sewage sludge anaerobic digestion facilities are or will be available (such as the STW in Yuen Long and Hung Shui Kiu). The biogas produced from the food waste/sewage sludge co-digestion process will be used for electricity generation to cover part of the need of the STW. In accordance with the existing arrangement for handling sewage sludge from STW, sewage sludge generated from the co-digestion process will be delivered, after dewatering, to the sludge treatment facility T·PARK in Tuen Mun for treatment so as to turn waste into energy. As T·PARK can process up to 2 000 tonnes of sludge per day (currently treating around 1 200 tonnes per day), the food waste contains about 85% moisture content, and the weight of food waste will be greatly reduced after anaerobic digestion, dewatering and/or drying processes, we anticipate that T·PARK is fully capable of treating the sewage sludge generated from the co-digestion process.

9. Regarding the pre-treatment of food waste under the Trial Scheme, apart from securing sites in the vicinity of STW to build food waste collection and pre-treatment facilities as far as possible, we will also consider conducting a site

search for building food waste pre-treatment facilities in various locations as far as circumstances permit to enhance the food waste collection capability and to reduce the need for cross-district collection and transportation of food waste. The food waste pulp, after being processed by the pre-treatment facilities, can be transported to STW via bulk collection vehicles for food waste/sewage sludge co-digestion.

10. According to overseas experience in food waste recycling, only around 50% of food waste can usually be recycled even if comprehensive food waste recycling facilities are available. We anticipate that with the above-mentioned initiatives in place (i.e. development of the ORRC network and the food waste/sewage sludge co-digestion technology), our overall food waste treatment capacity is expected to gradually increase in over ten years' time (by around mid 2030s) to around 1 800 tonnes of food waste per day, i.e. around 50% of the food waste currently generated. The future roadmap on the development of food waste treatment facilities is set out in the table below. We will review the development timely including expediting the works so as to cope with the demands.

Food Waste Treatment Facilities	Food Waste Treatment Capacity (tonne per day)		Year
	Increase	Total	
Organic Resources Recovery Centre Phase 1	200	200	2018
Trial Scheme at Tai Po Sewage Treatment Works	50	250	2019
Organic Resources Recovery Centre Phase 2	300	550	2022
Trial Scheme at Sha Tin Sewage Treatment Works	50	600	2022
Organic Resources Recovery Centre Phase 3	300	900	2026
Making use of other sewage treatment works where sewage sludge anaerobic digestion facilities are or will be available, including sewage treatment works at Tai Po, Yuen Long and Hung Shui Kiu; as well as food waste pre-treatment facilities being planned for construction	900	1 800	Around mid 2030s
Final Treatment Capacity :		1 800	Around mid 2030s

11. As illustrated in the above table, the ORRC2 will be the most crucial facility in the food waste recycling planning for the next few years, facilitating our plan to provide free food waste collection service to the C&I sector and commence the pilot scheme to collect domestic food waste. To enable an early commencement of the project, we have initiated parallel tendering for the ORRC2 in October 2016 and the tender invitation has been closed. We will only award the contract after funding is approved by the LegCo. If funding approval is not granted, we will need to terminate the tendering exercise and review the project design and its scope, as well as engage a consultant to re-conduct the engineering feasibility study[1] for the project, consult members of the local community such as the District Councils and Rural Committees[2], seek funding approval from the LegCo again, prepare tender documents, and re-conduct the tendering exercise. The whole process will take four to five years to complete, and together with another three years or so for the construction, it is estimated that the commissioning of the ORRC2 will be delayed to 2027. As for the environmental impact, it is estimated that the delay in commissioning the ORRC2 will, on the whole, increase food waste disposal at landfills by about 500 000 tonnes and increase carbon emissions by up to 300 000 tonnes.

Free Collection and Treatment of Food Waste from Commercial and Industrial (C&I) and Domestic Sources

12. The Government has commenced a study on territory-wide separation and collection of food waste from domestic and (C&I) sources. The consultant is currently collating and analysing information on local and overseas practices in the collection and delivery of food waste. The consultant will examine effective and feasible options for the collection and delivery of food waste, and based on Hong Kong's actual circumstances and environment, formulate

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[1] If the funding for the ORRC2 is not approved, we will review the design and requirements of the project (including construction cost estimates, treatment technologies, need on compost, and the consideration on converting biogas as bio-methane for town gas or electricity, etc.), and conduct engineering feasibility study again for these changes and prepare tender documents. For example, if we decide not to provide composting in the project, the building structures and construction area may be reduced by about 40%. In addition, we may need to provide more dewatering and drying facilities to process the residues from anaerobic digestion.

[2] Subject to the changes of the project, the design and treatment capacity may be adjusted and there may be corresponding changes in the environmental and traffic impact assessment. Hence, we need to consult District Councils and Rural Committees again, and submit the final scheme to the LegCo for consideration and re-conduct the tendering exercise after the funding is approved.

proposals on food waste collection and the necessary ancillary facilities in preparation for large-scale collection of food waste from domestic and C&I sources, and its delivery to relevant treatment facilities in the future. The study is expected to complete within 2019.

13. Since the C&I food waste has relatively stable quality and can be more easily separated at source and collected, both the O·PARK1 and the Trial Scheme at the Tai Po STW will mainly be used for collecting and recycling C&I food waste. We have launched a scheme under the Recycling Fund to provide the C&I sector with funds for procuring food waste pre-treatment facilities and subsidising part of the transportation cost for delivering food waste to the O·PARK1.

14. In her 2018 Policy Agenda, the Chief Executive mentioned that a pilot scheme would be introduced to examine the feasibility of implementing government-run free and permanent food waste collection services in the long run. The pilot scheme will primarily include the continued provision of food waste collection services for markets and cooked food centres under the Food and Environmental Hygiene Department, as well as markets and shopping centres managed by the Hong Kong Housing Authority. The pilot scheme will also include free food waste collection services for all primary and secondary schools, and tertiary institutions in Hong Kong within the second quarter of this year through those school lunch suppliers or the canteens of the tertiary institutions which are interested to join. This will help educate and encourage students to practise separation of food waste at source, and disseminate the messages of "Food Wise, Waste Reduction" and "Turning Waste into Energy" in educational establishments and the community. Depending on the capacities of the food waste treatment facilities, we are exploring various feasible options to provide food waste collection services with free transportation for part of the C&I sector under the pilot scheme.

15. Additionally, we will allocate part of the treatment capacities of the O·PARK1 and the Trial Scheme at the Tai Po STW to provide free collection and recycling services for part of the domestic food waste. Priority will be given to food waste from housing estates with experience in food waste separation and recycling, such as private housing estates having participated in the "Food Waste Recycling Projects in Housing Estates" under the Environment and Conservation Fund (ECF) (see **Table 1**). These housing estates have received funding support from the ECF for installing on-site food waste treatment facilities, organising relevant educational and promotional activities, and putting source separation and recycling of food waste into practice. We will take the initiative to invite these housing estates to join the aforesaid pilot scheme on free food waste collection service.

16. As mentioned in paragraph 7 above, the Government will extend the Trial Scheme to cover the Sha Tin STW for commissioning in 2022. Having regard to the experience gained from the above pilot scheme, we will conduct a trial on large-scale collection of domestic food waste in Sha Tin under the Trial Scheme to test the operational and facilitation requirements for carrying out separation at source, collection and recycling of domestic food waste at different types of private and public housing estates, villages and domestic/commercial buildings. After the commissioning of the ORRC2, we are not only able to extend the free food waste collection service to more C&I establishments but will also allocate part of its treatment capacity to recycle the domestic food waste collected from the households and villages within the area.

17. The implementation schedule of the above free food waste collection services will largely depend on the completion dates of the food waste recycling facilities. With the gradual completion of such facilities in future, we plan to extend the food waste collection services to cover all districts and sectors in Hong Kong in a prompt manner.

Applications of Compost from the O·PARK1 and Organic Resources Recovery Centre Phase 2

18. Treated food waste can be turned into compost for landscaping or agricultural uses. The O·PARK1 and ORRC2 are expected to produce about 6 500 and 10 000 tonnes of compost per year respectively. We will reserve some for use by government departments, farmers and members of the public. According to the feasibility study of the O·PARK1, the estimated annual compost demand in Hong Kong is over 32 000 tonnes. For example, compost is usually required for mixing with soil to help vegetation growth in the amenity areas of various works projects (including verges of highways). Hence, the local demand should fully absorb the compost from the O·PARK1 and ORRC2. Furthermore, as stated in paragraph 6 above, the consultant of the ORRC3 will review again whether there is still a need for that facility to produce compost. Subject to the study result, we may consider using the residue of food waste treatment for other purposes, such as turning waste into energy.

19. Moreover, to encourage government departments to use locally produced compost, the EPD is working with local academics and landscape architects to develop suitable soil and compost ratios and guidelines for reference by various departments and landscape architects so as to inspire the departments to give priority to compost produced locally while procuring such product.

Food Waste Reduction at Source

20. Reducing food waste at source will remain to be the focus of future work. We will continue to implement the Food Wise Hong Kong Campaign and conduct publicity and education work, including Announcements in the Public Interest on reducing food waste at radio and television channels, "Big Waster" posters, leaflets and slogans, roving exhibitions, the Food Wise talks, the "Food Wise Hong Kong Campaign" website, the "Big Waster" Facebook, the education materials for reducing food waste and the "Food Waste Reduction Good Practice Guides", etc. We will continue to collaborate with the C&I sector to implement the "Food Wise Charter" and the "Food Wise Eateries" Scheme to enhance the public's understanding and participation in the "Food Wise, Waste Reduction" culture, as well as food waste separation and recycling.

21. The EPD will also continue to support non-government organisations in implementing the surplus food recovery projects through the ECF. Surplus food which is still edible or will expire soon is collected from wet markets, retail shops and food wholesalers for donation to the needy in the community to achieve the goal of reducing food waste and caring for society. As of December 2018, the ECF has approved about $68 million for 37 surplus food recovery projects. It is anticipated that about 6 900 tonnes of surplus food will be recovered and more than 8.9 million headcounts will be benefited.

22. As mentioned in paragraph 15 above, the ECF has launched the "Food Waste Recycling Projects in Housing Estates" funding scheme to encourage housing estates to carry out their own food waste separation and on-site recovery programmes. Since July 2011, the ECF has earmarked a sum of $60 million to support private housing estates to install on-site food waste treatment facilities and organise relevant educational and promotional activities to enhance residents' awareness of food waste reduction, as well as source separation and recycling of food waste. At present, the ECF is accepting applications under the scheme. The EPD has offered help-desk service for the aforesaid projects to provide technical support for interested housing estates. Briefings have also been held for the owners' corporation and property management companies of these housing estates to brief them on the technical information and application procedures, and share with them the experience in food waste recycling. Since the scheme was launched, 35 projects have been approved by the ECF and a total of about 2 000 tonnes of food waste have been recovered.

Conclusion

23. The Government has a plan to set up a network of ORRCs and will make use of the facilities in STW to conduct food waste/sewage sludge co-digestion

so as to promptly increase the overall food waste recycling capacity across the territory. We hope that the overall food waste treatment capacity will be gradually increased to about 1 800 tonnes per day, i.e. about 50% of the food waste generated currently, in over ten years' time (i.e. by around mid 2030s). We will launch a pilot scheme in 2019 to use the treatment capacity of the O·PARK1 and the Trial Scheme at the Tai Po STW to provide free food waste collection services (covering both transportation and treatment) for C&I and domestic sources in a progressive manner.

24. The ORRC2 is the most crucial facility under the food waste treatment strategy in the next few years. We hope that its funding will be approved and with contract awarded in the first half of 2019 so that the facility can be commissioned in 2022 the earliest. As the implementation progress of free food waste collection services will largely depend on the completion dates of the food waste recycling facilities, our plan on extending the food waste collection services to gradually cover all districts and sectors in Hong Kong, whereby reducing the expenses of the public and C&I sectors under the forthcoming Municipal Solid Waste Charging Scheme, will hinge on the implementation timetables of the food waste recycling facilities.

Environment Bureau/Environmental Protection Department
February 2019

Table 1

Housing Estates Participated in
"Food Waste Recycling Projects in Housing Estates"
under the Environment and Conservation Fund

Housing Estate	District	Housing Estate	District
Lung Poon Court	Wong Tai Sin	Sereno Verde	Yuen Long
The Latitude	Wong Tai Sin	Grand Del Sol	Yuen Long
Scenic View	Wong Tai Sin	Tin Shing Court	Yuen Long
Aria Kowloon Peak	Wong Tai Sin	The Parcville	Yuen Long
Rhythm Garden	Wong Tai Sin	Laguna Verde	Kowloon City
Manhattan Hill	Sham Shui Po	Hong Lok Yuen	Tai Po
Sceneway Garden	Kwun Tong	Ming Nga Court	Tai Po
Lei On Court	Kwun Tong	The Capitol, LOHAS Park	Sai Kung
Peak One	Sha Tin	Woodland Crest	North
Discovery Bay	Islands	Metropolis Plaza	North
Grand Promenade	Eastern	Gold Coast	Tuen Mun
Braemar Hill Mansion	Eastern	Grand Pacific Views/Heights	Tuen Mun
Pacific Palisades	Eastern	Aegean Coast	Tuen Mun
Residence Bel-Air	Southern	Siu Lun Court	Tuen Mun
Chi Fu Fa Yuen	Southern	Serenade Cove	Tsuen Wan
Po Sing Centre	Kwai Tsing	Park Island	Tsuen Wan
Wonderland Villas	Kwai Tsing	Allway Garden	Tsuen Wan
Tierra Verde	Kwai Tsing		