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HOMEPAGE: http://www.epd.gov.hk

Environmental Protection Department Headquarters
16/F, East Wing,
Central Government Offices,
2 Tim Mei Avenue,
Tamar, Hong Kong

環境保護署總部
香港添馬添美道2號
政府總部東翼16樓

(傳真號碼：2869 6794)

香港中區立法會道一號
立法會綜合大樓
立法會秘書處
立法會工務小組委員會秘書
（經辦人：盧慧欣女士）

盧女士：

立法會工務小組委員會

有關有機資源回收中心第二期

有關立法會工務小組委員會於2019年3月20日的會議上，議員要求政府就有機資源回收中心第二期提交補充資料，有關文件載於**附件**以供議員參考。

環境保護署署長

（徐浩光 徐 代行）

2019年4月18日

Annex

Supplementary information
on the Organic Resources Recovery Centre Phase 2 requested at
the meeting of Public Works Sub-committee held on 20 March 2019

1.	**At the request of Hon Chan Hak-kan, the Government shall provide supplementary information to explain the details of the free collection of domestic food waste under the "food waste/sewage sludge anaerobic co-digestion" trial scheme (Trial Scheme) to be conducted in the Tai Po Sewage Treatment Works (STW) and the Sha Tin STW, including housing estates and districts where food waste will be collected.**
2.(a)	**At the request of Hon Wu Chi-wai, the Government shall provide the following supplementary information:** **To explain the details of the implementation of the trial scheme on collection of domestic food waste, including the timetable for implementation, method of food waste collection, the collection quantity target, and how nuisance to the public can be avoided during food waste collection.**
Reply:	To promote proper recycling of food waste and achieve the target of turning waste into energy, the Chief Executive mentioned in her 2018 Policy Agenda that a pilot scheme would be introduced to examine the feasibility of implementing government-run free food waste collection services in the long run. We will allocate a portion of the treatment capacity of the Organic Resources Recovery Centre Phase 1 (O·PARK1) and the Trial Scheme at the Tai Po STW to provide free collection and recycling services for about 50 tonnes per day of domestic food waste (the total food waste treatment capacity of the two facilities will be 250 tonnes per day). Priority will be given to food waste from housing estates with experience in food waste separation and recycling, such as the 35 private housing estates that have 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. In

	addition, we will liaise with the Hong Kong Housing Authority (HA) and the Hong Kong Housing Society (HS) to invite their participation in the pilot scheme in public housing estates. We will accord priority to and invite public housing estates with experience in waste separation and/or handling food waste separation and recycling (see **Table 2**) to join the pilot scheme. For example, public housing estates that have participated in the food waste recovery trial under the Green Delight in Estates organized by the HA, or the Community Involvement Projects for Waste Reduction Through Quantity-based Municipal Solid Waste Charging funded by the ECF and the Municipal Solid Waste Charging Trial Projects funded by the Environmental Protection Department (EPD). During the implementation of the free food waste collection pilot scheme in housing estates, we will carry out tests on different modes of food waste collection in stages. For instance, we will make reference to the experience in Europe or Korea in making use of enclosed or automatic equipment operated by smart card to collect food waste. Furthermore, we will examine how to avoid nuisance during food waste collection under the pilot scheme, including the use of enclosed tanker for food waste delivery to prevent odour nuisance and leakage of leachate, liaison with representatives of property management offices and building owners on the installation of food waste collection equipment at suitable locations in the housing estates, and arranging food waste collection daily, so as to develop one or more food waste collection modes to facilitate disposal of food waste by the residents and at the same time minimize the nuisance to the environment caused by the food waste. Moreover, the Recycling Fund also covers food waste related projects for developing and conducting tests on different modes of food waste collection. In addition, we are planning to extend the "food waste / sewage sludge anaerobic co-digestion" technology to Sha Tin STW for commissioning in 2022. The facility will mainly receive domestic food waste from Sha Tin district with a daily food waste treatment capacity of about 50 tonnes. Having regard to the experience gained from the above-mentioned pilot scheme, we will carry out the trial in Shatin 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. Subject to the funding approval of the Legislative Council (LegCo) for the Organic Resources Recovery Centre Phase 2 (ORRC2), we will

	allocate part of the treatment capacity of the ORRC2 to treat domestic food waste from North District upon its commissioning in 2022. It is estimated that after the launch of the Trial Scheme at the Sha Tin STW and the commencement of operation of the ORRC2 in 2022, the total food waste treatment capacity in Hong Kong will reach 600 tonnes per day. One-third of this treatment capacity will be used to treat domestic food waste, which means the domestic food waste treatment capacity will be increased to 200 tonnes per day. We are conducting an engineering feasibility study and an Environmental Impact Assessment for the Organic Resources Recovery Centre Phase 3 (ORRC3). Depending on the progress in the preparation and subject to the approval of funds from the LegCo, we hope to commission the ORRC3 in 2026 with a daily food waste treatment capacity of 300 tonnes. By that time, the overall food waste treatment capacity territory-wide will reach 900 tonnes per day. According to overseas experience in food waste recycling, only around 50% of food waste can be recycled even if comprehensive food waste recycling facilities are available. Currently, around 1 200 tonnes of food waste is generated by the commercial and industrial (C&I) sector in Hong Kong, which means that 600 tonnes of C&I food waste needs to be treated. On this basis, we will use the remaining food waste treatment capacity of 300 tonnes per day (one-third of the total food waste treatment capacity in Hong Kong) to treat domestic food waste. Subject to the habits and experience of the public in food waste separation and recycling, we will plan the food waste collection areas for ORRC3. Subject to the progress and development of the remaining food waste treatment facilities (including the ORRC3, as well as other ORRCs and food waste/sewage sludge anaerobic co-digestion facilities which may be built in the future), we anticipate that Hong Kong's overall food waste treatment capacity will be increased to about 1 800 tonnes per day by around mid-2030s. This would amount to 50% of food waste generated at present. Subject to the progress of and experience gained from the collection of food waste collection from the C&I and domestic sources, it is our plan to use most of such further food waste treatment capacity mentioned above to treat domestic food waste. 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.

2.(b)	**Please explain how the Government will provide financial incentives to motivate the commercial and industrial sector to perform source separation of food waste and deliver the food waste to the Government for treatment after the implementation of the Municipal Solid Waste Charging Scheme.**
Reply:	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 C&I sector; and subject to the experience gained from the pilot scheme and the progress on developing food waste treatment and recycling centres in Hong Kong, to ultimately extend the free food waste collection service to all sectors in Hong Kong. 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 facilities for treatment of C&I food waste and subsidising part of the transportation cost for delivering food waste to the O·PARK1 and other appropriate recycling facilities. We will continue to provide food waste collection services through the pilot scheme for public markets and cooked food venues under the Food and Environmental Hygiene Department, as well as wet 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 starting from the second quarter of this year through those school lunch suppliers or 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 cost for part of the C&I sector under the pilot scheme. This includes collaborating with the food and beverage sector and the property management sector to conduct food waste collection trial for around 100 restaurants and eateries (including tea houses, Chinese restaurants and fast food shops, etc.) through the

	Recycling Fund and the ECF. In parallel, we are also exploring the provision of free food waste collection services for some of the C&I establishments which have been proactively delivering their food waste from different districts to the O·PARK1 at present. The number of establishments involved and the scale of collection are subject to the treatment capacities of the food waste recycling facilities. Once the Municipal Solid Waste Charging Scheme is implemented, any food waste disposed of by the C&I sectors as municipal solid waste will become chargeable under the scheme. Whereas separating the food waste for the free collection and delivery to ORRCs for treatment by the government can reduce the cost required for disposing of municipal solid waste. We therefore believe that by providing free food waste collection services (covering both transportation and treatment) for the C&I sector and implementing the Municipal Solid Waste Charging Scheme, we can provide sufficient financial incentives to encourage the C&I sector to carry out source separation and treatment of food waste.
3.	**At the request of Hon HUI Chi-fung, the Government shall provide supplementary information to elaborate on the details of the study currently conducted by the Government on territory-wide separation and collection of food waste from domestic, commercial and industrial sources, including the specific direction and focus area of the study.**
Reply:	In accordance with "A Food Waste & Yard Waste Plan for Hong Kong 2014-2022" (Food Waste Plan), the EPD commenced a consultancy study on food waste collection in March 2017 and the study is expected to be completed within 2019. The main objectives of the study are to review, investigate and explore options for the collection and delivery of domestic and C&I food waste. Subject to the latest development in waste treatment facilities and the progress of the related waste reduction policies such as policies on reuse and recycling of 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, recommend suitable auxiliary and ancillary facilities. Taking into consideration that the need to make reference to cities having similar social situation and development as Hong Kong as well as an effective and feasible food waste collection and delivery system, the consultant has selected six reference cities (including Taiwan, Seoul, London, Milan, San Francisco and Seattle), and collected and compiled

	information on the collection and delivery of food waste from these cities. In parallel, in order to investigate the participation rate and efficiency of source separation of food waste, the consultant has selected respondents from different sectors of the society (including domestic and C&I sectors, schools and government institutions) through random sampling to conduct an opinion survey to gather their views on food waste separation and collection. The consultant is currently consolidating and compiling the views on food waste separation collected from different sectors, and will take into account the overseas experience in food waste collection and delivery, as well as the results of the local opinion survey so as to identify effective and feasible options for the collection and delivery of food waste that are suitable for the local conditions. These include the development progress and plan for the food waste treatment and recycling facilities, storage space required to perform food waste separation, the mode and arrangement for food waste collection and delivery, types of delivery vehicles, as well as auxiliary and ancillary facilities for temporary food waste storage on site, etc.
4.(a)	**At the request of Hon TAM Man-ho, the Government shall provide supplementary information:** **To provide a comparison of the original estimation of O·PARK1's annual amount of surplus electricity produced and the justifications for setting the offtake price of the surplus electricity to the power companies with that of the current situation since its actual operation; and**
Reply:	Located at Siu Ho Wan of Lantau Island, the O·PARK1 can treat 200 tonnes of food waste per day. With the adoption of biodegradation technologies in the O·PARK1, food waste is not only treated properly, but also turned into energy through biogas generation, and the residue produced after anaerobic digestion will also be converted into compost. In addition to satisfying the internal power demand of the facility, we expect that the O·PARK1 can export about 14 million kilowatt-hours of surplus electricity annually. This estimate is based on the outcomes of the feasibility study. The calculation is based on the estimation that the O·PARK1 can produce around 9 million cubic metres of biogas annually when the designed food waste treatment capacity at 200 tonnes per day is reached. The biogas produced will then be converted to around 28 million kilowatt-hours of electricity, half of which will be used by the facility itself while the other half will be exported to the

	power grids. During the initial operation of the O·PARK1, it is necessary to gradually increase the amount of food waste treated to ensure that there is sufficient time for the micro-organisms used to degrade food waste in the anaerobic tanks to grow steadily. Currently, the O·PARK1 is treating about 100 tonnes of C&I food waste per day, generating 16 000 cubic metres of biogas. The amount of biogas generated is dependent on the organic content in the food waste. Although the actual quantity of food waste treated at the O·PARK1 is only half of its designed capacity at the moment, the O·PARK1 has been able to export surplus electricity to the power grids after providing the basic electricity demand for the operation of the facility. Hence, with the gradual increase in the food waste treatment quantity of the O·PARK1 to 200 tonnes per day, the amount of surplus electricity exported to the power grids will increase accordingly, eventually reaching or even exceeding the original estimated level. Besides, in accordance with the contractual requirement of the O·PARK1, a monthly operation fee (including fixed and variable operation fee) shall be made to the contractor during the operation phase. Part of the variable operation fee is calculated based on the amount of surplus electricity exported to the power grids, thereby encouraging the contractor to improve its operation so as to generate more surplus electricity. As for the setting of offtake price of surplus electricity, the price should be set on the premise that the electricity generation cost of the power companies will not be affected and the tariff burden of the public will not be increased. Hence, we have used the marginal fuel cost of electricity generation saved by the power companies for purchasing electricity from the O·PARK1 as a basis to set the offtake price of surplus electricity. If a higher offtake price is adopted, the power companies may pass the relevant additional cost of purchasing the electricity on to the consumers.
4.(b)	**To explain how the annual amount of surplus electricity and the revenue generated from selling surplus electricity of the ORRC2 are estimated.**
Reply:	Located at Sha Ling of the North District, the ORRC2 can treat 300 tonnes of food waste per day. With reference to the experience of the O·PARK1, it is estimated that the renewable energy generated by the

	ORRC2, after satisfying the internal demand of the facility itself, can export about 5 million cubic metres of surplus bio-methane or 24 million kilowatt-hours of surplus electricity annually. As mentioned in Section 4(a) above, on the premise that the electricity generation cost of the power companies will not be affected and the tariff burden of the public will not be increased, the annual revenue of electricity sale is estimated to be about $7 million (calculated at the fuel cost that is effective from October 2018).

Environmental Protection Department
April 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		

Table 2

Public Rental Housing Estates Participated in Food Waste Recycling Projects in Housing Estates

Housing Estate	**District**	**Housing Estate**	**District**
Ching Ho Estate	North	Tin Tsz Estate	Yuen Long
Lai Kok Estate	Sham Shui Po	Tin Wah Estate	Yuen Long
Nam Shan Estate	Sham Shui Po	Grandeur Terrace	Yuen Long
Lai On Estate	Sham Shui Po	Tin Ching Estate	Yuen Long
Tsz Ching Estate	Wong Tai Sin	Kai Tin Estate	Kwun Tong
On Yam Estate	Kwai Tsing	Sun Chui Estate	Sha Tin
Lei Muk Shue Estate	Tsuen Wan	Kwun Lung Lau*	Central and Western
Lok Man Sun Chuen*	Kowloon City	Kwun Tong Garden Estate*	Kwun Tong

* Public Rental Housing Estates under Hong Kong Housing Society