

**Legislative Council  
Panel on Environmental Affairs**

**Government's Response on Follow-up actions for  
Organic Resources Recovery Centre Phase 2  
at the Meeting on 19 July 2018**

Regarding the questions on the Organic Resources Recovery Centre (ORRC) Phase 2 (ORRC2) raised by members at the meeting of the Legislative Council Panel on Environmental Affairs on 19.7.2018, our response is as follows.

**(a)(i) the content of the contract for the design and build of the ORRC2 contract to be awarded after funding approval by the Finance Committee;**

2. The Government can only award the design and build contract for ORRC2 after the funding is approved by the Finance Committee. As the contract has not been awarded at this stage, we are not able to provide the relevant documents. After the funding is approved by the Finance Committee, the Environmental Protection Department (EPD) will sign the contract with the successful contractor and then provide the relevant key information to the Panel on Environmental Affairs. The design and build contract for the project will cover (a) design and construction of the ORRC2 with a capacity of 300 tonnes per day; (b) design and construction of associated architectural, building, civil and landscape works; (c) design and construction of heat recovery, power generation and surplus renewable energy export facilities; and (d) provision of pollution control and environmental monitoring facilities. Subject to funding approval of the Finance Committee (FC), the project will be commenced in the first quarter of 2019 for commissioning in the fourth quarter of 2021.

**(a)(ii) the weightings assigned to different criteria (including technical and price aspects) under the marking scheme for the ORRC2 tender assessment;**

3. The marking scheme for the ORRC2 tender assessment is set out in **Enclosure 1**.

**(a)(iii) whether the contractor of ORRC1 was allowed to bid the ORRC2 contract and, if so, whether its tender would be given additional scores;**

4. According to the current mechanism, unless the contractor of ORRC1 was temporarily suspended from bidding for whatever reasons, he would be allowed to bid for the ORRC2 contract. However, the tender submitted by the contractor of ORRC1 would not be given additional scores because of its identity being the contractor of ORRC1.

**(b) a breakdown of the estimated design and construction costs of about \$2,500 million of ORRC2;**

5. We have estimated the construction cost of ORRC2 to be \$2,453 million in money-of-the-day (MOD) prices and the annual recurrent expenditure during the 15-year operation period to be \$107.92 million at current prices. For the breakdown of the estimated design and construction costs of ORRC2, please refer to **Enclosure 2**.

**(c) a list of food waste treatment facilities using the anaerobic digestion and composting technologies in other major jurisdictions and their respective design and construction costs;**

6. According to the information of international conferences and the Internet on the facilities using anaerobic digestion and composting technologies to treat food waste in other major jurisdictions, due to differences in food culture, share of industry and agriculture in the economic structure and geographical environment, the composition of food waste and the treatment technologies vary from place to place. In Europe and America (such as Germany and Canada) where agriculture is more developed, more plants mix food waste with yard waste and make use of dry anaerobic digestion (i.e. solid content of 20-40%) treatment technology. The yard waste mainly serves as bulking agent to generate more compost for use in agricultural farming and horticulture. On the other hand, more plants in Asia (such as Japan and Korea) adopt wet anaerobic digestion (i.e. solid content of 10-20%) treatment technology, which is the technology adopted by ORRC1. In addition, many places (such as U.S.A. and Japan) are using sludge/food waste co-digestion at

sewage treatment works. And if animal husbandry is practised in the vicinity of food waste treatment plant, “co-digestion of animal waste and food waste” system will be utilized. The sludge generated from co-digestion will be dewatered and then carbonized or incinerated directly for conversion to energy.

7. As the treatment facilities of food waste in other places may involve other treatment technologies, organic matters (such as animal waste or yard waste), or food waste pre-treatment processes that may have to meet other environmental monitoring requirements, most of the overseas facilities cannot be directly compared with our organic resources recovery centres. Among these overseas facilities, the wet anaerobic digestion facility at Toyohashi City, Aichi Prefecture, which came into operation in 2017 (adopting the same technology as ORRC1), handles 59 tonnes of food waste and a similar amount of sewage sludge solids daily. Its construction cost is JPY 14 billion (approx. HK\$ 1 billion). Also, a facility at Stausebach, Kirchhain, Germany utilizing a mix dry and wet anaerobic digestion technology to treat 100 tonnes of food waste daily commenced operation in 2014. The anaerobic digestion system alone costs EUR 12 million (approx. HK\$ 100 million). As above-mentioned, since the food waste composition and treatment methods of these facilities are quite different from the situation in Hong Kong, the figures are for reference only and cannot be compared directly with those of ORRCs.

8. In accordance with the Government’s established policy, we have invited local and overseas companies through open, fair, competitive and transparent tendering procedures to participate in bidding for the contract to treat food waste in Hong Kong, so as to obtain competitive tenders which meet local requirements.

**(d) the possible uses of the compost and renewable energy produced by ORRC1, including whether the compost could be fully absorbed by the local market, and whether and how government departments would give priority to using the compost;**

9. ORRC1 started commissioning in July 2018 and the current food waste treatment capacity is 100 tonnes per day. The biogas generated through anaerobic digestion process is a renewable energy source, which will be combusted in a combined heat and power (CHP) system for power generation to sustain the plant operation and will generate heat to maintain the temperature of the anaerobic digestion system. Any surplus power generated during full

operation will be exported to CLP's electricity grid. As for the residue generated after anaerobic digestion of food waste, it will be converted into about 6 500 tonnes of mature compost per year through the composting system, which will help turn waste into resources.

10. The compost product of ORRC1 shall comply with the relevant quality standards according to "Agricultural and Non-Agricultural Uses" as stipulated in "Compost and Soil Conditioner Quality Standards - 2005" published by "Hong Kong Organic Resource Centre" (HKORC). Compost meeting such quality standards is suitable for farming and landscaping applications. According to the Feasibility Study of ORRC1, the annual compost demand in Hong Kong is estimated at over 32,000 tonnes, hence it is expected that the local market have the capacity to absorb the compost from ORRC1 and ORRC2.

11. Under the Contract, apart from providing the Government free-of-charge with 10% of mature compost for distribution to visitors and other government departments, the ORRC1 contractor is also responsible for promoting and selling such compost locally.

12. In addition, to encourage government departments to use locally produced compost, EPD is working with local academics and horticulturists to develop suitable soil and compost ratios and guidelines for reference by various departments and horticulturists so as to encourage the departments to give priority to compost produced locally when procuring such product.

**(e) the Administration's latest plan for improving the management and recycling of yard waste in Hong Kong.**

13. The Environment Bureau promulgated "A Food Waste and Yard Waste Plan for Hong Kong 2014-2022" (the Plan) in February 2014, which sets out the Government's strategies to deal with organic waste, including collecting data, promoting waste reduction at source, encouraging separation and collection as well as exploring the most suitable means to treat the unavoidable waste. The Plan has the support from various bureaux and related departments. For example, the Greening, Landscape and Tree Management Section of Development Bureau has announced guidelines in July 2014 as general reference for departments, setting out measures to reduce yard waste in various stages from greening design to maintenance works.

14. In dealing with yard waste, government departments will continue to adhere to the principles of reduce, reuse and recycle, and implement various measures to reduce yard waste as much as practicable, including natural degradation, composting, mulching and reusing as recreational facilities or decoration. The Agriculture, Fisheries and Conservation Department will treat yard waste on site, including piling the yard waste at a nearby location to create a habitat for the wildlife. The yard waste will release nutrients to the natural environment when decomposing. Suitable tree trunks will be used for installation of leisure facilities or production of decorative items such as animal statue, sign post, bench etc. The Leisure and Cultural Services Department (LCSD) has commenced the planting of multi-colour leaves perennial plants to replace annual plants, in order to reduce waste at source. LCSD also utilizes compost barrel to produce compost at suitable locations or delivers yard waste to animal waste composting plant for treatment. The greening works of the infrastructure works, geotechnical engineering works and the Greening Master Plan of the Civil Engineering and Development Department have all adopted local perennial plant species as the main theme of design and native plants are planted to suit the geographical environment. This will help local ecological growth and reduce the frequency of plant replacement, thereby reducing yard waste.

15. An interdepartmental working group is exploring other ways to recover, reuse and recycle yard waste to help treat yard waste generated from various government departments and increase recovery rate by, for example, shredding yard waste with shredder, using shredded yard waste as bulking agent in the composting process, grinding yard waste to wood dust or making wood pellets under normal temperature or making bio-charcoal under high temperature. Based on overseas study and experience, the manufactured wood dust and wood pellets can be used as solid fuel in boiler or cement manufacturing process. The bio-charcoal can be used for improving soil condition, barbecuing food or converting waste to energy.

**Environmental Protection Department**  
**November 2018**

**Organic Resources Recovery Centre Phase 2**  
**Marking Scheme Summary**

The contents of the tender assessment include two parts, namely “Technical Proposal” and “Tender Price”. Both carry equal weight and each constitutes 50%. The marking details are as follows.

<b>“Technical Proposal” - rating and criteria</b>		<b>50%</b>
<b>1</b>	<b>Tenderer’s Experience Record</b> Experience in carrying out design-and-build (D&B) or design-build-operate (DBO) contract; experience in design and installation of the electrical and mechanical works for Organic Waste Treatment Plant adopting anaerobic digestion process; experience in operation and maintenance of Organic Waste Treatment Plant adopting anaerobic digestion process; experience in design and installation of electrical and mechanical works for Organic Waste Treatment Plant adopting composting process; and experience in operation and maintenance of Organic Waste Treatment Plant adopting composting process.	<b>2%</b>
<b>2</b>	<b>Project Management and Human Resources</b> Outline Project Management and Human Resources Plans	<b>3.3%</b>
<b>3</b>	<b>Design and Construction of the Works</b> Outline Design and Works Plans	<b>23.4%</b>
<b>4</b>	<b>Operation</b> Outline Operation, Asset Management and Handback Plans	<b>14%</b>
<b>5</b>	<b>Environmental Management, Quality, Safety and Health Plans</b> Outline Environmental Management, Quality, and Safety and Health Plans	<b>2.7%</b>
<b>6</b>	<b>Surplus Energy Export</b> Design for the system to export Surplus Energy	<b>2.5%</b>
<b>7</b>	<b>Past Performance</b> Workmanship, Operation, Progress, Site Safety, Safety Rating, General obligations, Environmental monitoring and pollution control, Attitude to claims, and Record against convictions under the Immigration Ordinance, Employment Ordinance or other site safety, environment related and road opening offences	<b>2.1%</b>
<b>“Tender Price” - rating and criteria</b>		<b>50%</b>
<b>1</b>	<b>Capital and Operation Fees</b>	<b>47.5%</b>
<b>2</b>	<b>Royalty Payment on Revenue</b> (i.e. the income from the sale of biogas and electricity)	<b>2.5%</b>
<b>TOTAL</b>		<b>100%</b>

**A breakdown of the estimated design and construction costs of  
about \$2,500 million of ORRC2**

	<b>\$ million (in MOD prices)</b>
(a) Site formation, geotechnical, drainage and civil works	89.4
(b) Architectural, building and landscape works	836.2
(c) Organic resources recovery facilities	626.1
(i) Waste receiving system <sup>1</sup>	92.7
(ii) Pre-treatment system <sup>2</sup>	94.1
(iii) Anaerobic digestion system <sup>3</sup>	96.5
(iv) Composting system <sup>4</sup>	66.2
(v) Biogas cleaning and storage system <sup>5</sup>	81.5
(vi) Associated electrical, control and instrument installations	195.1
(d) Ancillary works and facilities <sup>6</sup>	158.5
(e) Waste water treatment system	56.8

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<sup>1</sup> Item (c)(i) is for the design, construction and installation of the food waste receiving system. The works involve the provision of waste reception, monitoring, measurement, storage and feeding, and vehicle registration and washing facilities.

<sup>2</sup> Item (c)(ii) is for the design, construction and installation of the food waste pre-treatment system. The works involve the provision of conveying, screening and grit removal, metal separation, shredding, crushing and mixing equipment.

<sup>3</sup> Item (c)(iii) is for the design, construction and installation of the anaerobic digestion system. The works involve the provision of anaerobic digesters, dewatering system, pressure relief safety device, biogas sampling facilities, pumps and pipe-works.

<sup>4</sup> Item (c)(iv) is for the design, construction and installation of the composting system. The works involve the provision of mixing drums, composting tunnels, maturation area, final screen, and storage and bagging facilities.

<sup>5</sup> Item (c)(v) is for the design, construction and installation of the biogas cleaning and storage system. The works involve the provision of biogas cleaning facilities, biogas storage tanks and standby flaring gas units.

<sup>6</sup> Item (d) is for the design and construction of ancillary works and facilities. The works involve the provision of temporary office and site accommodation, temporary roads, maintenance workshop and utility yard during construction.

	<b>\$ million (in MOD prices)</b>
(f) Heat recovery, power generation and surplus RE export systems	190.0
(g) Pollution control and environmental monitoring facilities	112.0
(h) Environmental mitigation measures and environmental monitoring and audit for construction works	22.1
(i) Furniture and equipment	0.4
(j) Consultants' fees for	21.6
(i) contract administration	11.2
(ii) management of resident site staff	6.3
(iii) operational performance reviews	4.1
(k) Remuneration of resident site staff	94.6
(l) Contingencies	245.3
<b>Total</b>	<b>2,453.0</b>