

**Legislative Council Panel on Environmental Affairs**

**5172DR – Organic Waste Treatment Facilities Phase 1  
Information Note on Project Cost Estimate**

**PURPOSE**

This paper updates Members on the project cost estimate for the proposed organic waste treatment facilities (OWTF) Phase 1 based on the tender exercise.

**POLICY SUPPORT**

2. The Government announced in the 2009 Policy Address the intention to develop recycling facilities to process and recycle food waste generated by the commercial and industrial sectors. The need and importance for such food waste recycling facilities was reaffirmed in the Food Waste and Yard Waste Plan for Hong Kong (2014-2022) issued in February 2014.

3. Notwithstanding the efforts for food waste avoidance and reduction, suitable and adequate food waste treatment and recycling facilities are necessary to treat and recycle food waste that cannot be avoided. In light of the fact that Hong Kong generates a very large amount of food waste each day, and that food waste in general decomposes quickly and is not suitable for compaction at refuse transfer stations for long-haul transport, the most suitable method to recycle food waste is to create a network of recycling plants. This approach enables food waste to be transported quickly from population centres to the facilities that are not too far away thereby reducing potential nuisance. We have set out in the Plan that Hong Kong among other things needs to build a network of around five to six OWTFs with a total recycling capacity of about 1,300-1,500 tonnes per day. This network is essential for achieving the target of reduction.

**PREVIOUS PANEL CONSULTATION**

4. To expedite the planning and development of recycling facilities, we presented a discussion paper at the Panel on Environmental Affairs (the EA Panel) meeting on 22 November 2010 on the proposed OWTF Phase I as soon as the Environmental Impact Assessment was completed and the technical feasibility was confirmed. As the proposed facility would be the first of its kind in Hong Kong and in view of the necessity to develop recycling facilities as soon as

possible, we reported in the relevant discussion paper the scope of the project, the then crude estimated capital costs at \$489 million in money-of-the-day (MOD) price, and that we planned to proceed with the tendering for the design-build-operate contract for the OWTF phase 1 project before seeking funding approval from the Public Works Subcommittee (PWSC) and Finance Committee (FC) on the basis of the tender results. Members noted these proposals and raised no objection.

5. Having consulted the EA Panel, we continued with detailed feasibility and design studies, taking into account the site conditions and operational requirements based on the experience of the pilot food waste treatment facility in Kowloon Bay. Based on the findings of these detailed studies, we drew up tender specifications and conducted tender exercises in accordance with the established mechanism. A pre-qualification exercise was conducted in 2010 and based on the results tender invitations were issued. The tender exercise was closed in November 2011.

## **FIRST TENDER EXERCISE**

6. The received tenders were of very high prices. While the returns reflected the requirements based on detailed studies on site conditions and operational needs, our analysis also indicated that other key contributing factors were the market volatility in the economic situation in general and in particular in the construction industry since 2010. These factors would significantly add to the premium made in the tender returns for the risks and costs in the project delivery. We have identified scope to suitably adjust the performance requirements without adversely affecting the operational and environmental standards expected of the OWTF project.

7. Having regard to the above, we introduced appropriate measures to balance the construction and price risks to both the Government and the Contractor with a view to lowering the capital and operating costs. These measures included extending the design and construction period from 24 months to 27 months; introducing more milestone payments to reduce the finance cost throughout the design and construction period; and introducing a guaranteed food waste tonnage of 50 tonnes per day to share out the risk of waste quantity uncertainty between the Government and the Contractor.

8. We carried out a re-tendering exercise through open tendering in February 2013 and completed the tender evaluation in January 2014.

## RE-TENDER RESULTS

9. Most of the returned tender prices from the re-tendering exercise are lower than those from the previous cancelled tender exercise. Based on these current returned tender prices, we have updated the project cost estimate to reflect the latest market price for the construction and operation of this facility under the current market conditions and operational requirements.

10. We estimate the capital cost of the proposed works to be \$1,532.8 million in MOD prices, broken down as follows –

	<b>\$ million</b>
(a) Site formation, geotechnical, drainage and civil works	131.1
(b) Architectural, building and landscape works	447.5
(c) Organic waste treatment facilities	330.1
(i) Waste receiving system <sup>1</sup>	78.5
(ii) Pre-treatment system <sup>2</sup>	47.4
(iii) Anaerobic digestion system <sup>3</sup>	57.2
(iv) Composting system <sup>4</sup>	20.5
(v) Biogas cleaning and storage system <sup>5</sup>	20.6
(vi) Associated electrical, control and instrument installations	70.0

<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.

		<b>\$ million</b>	
	(vii) Testing and commissioning of facilities	35.9	
(d)	Ancillary works and facilities <sup>6</sup>	62.5	
(e)	Waste water treatment system	48.0	
(f)	Heat recovery, power generation and surplus electricity export systems	99.6	
(g)	Pollution control and environmental monitoring facilities	41.5	
(h)	Mitigation measures and environmental monitoring and audit (EM&A) for construction works	12.1	
(i)	Consultants' fees for	24.1	
	(i) contract administration	19.4	
	(ii) management of resident site staff	2.3	
	(iii) operational performance reviews	2.4	
(j)	Remuneration of resident site staff	16.7	
(k)	Contingencies	<u>121.3</u>	
	Sub-total	1,334.5	(in September 2013 prices)
(l)	Provision for price adjustment	<u>198.3</u>	
	Total	<u>1,532.8</u>	(in MOD prices)

<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.

11. Due to insufficient in-house resources, we propose to engage consultants to undertake contract administration for the proposed works, and carry out operational performance reviews for 12 months upon completion of the construction.

12. Subject to funding approval, we will phase the expenditure as follows –

<b>Year</b>	<b>\$ million (Sept 2013)</b>	<b>Price adjustment factor</b>	<b>\$ million (MOD)</b>
2014 – 2015	200.0	1.05450	210.9
2015 – 2016	605.0	1.11777	676.3
2016 – 2017	273.0	1.18484	323.5
2017 – 2018	256.5	1.25593	322.1
	1,334.5		1,532.8

13. We estimate that the annual recurrent expenditure arising from the proposed works to be about \$72.4 million. The capital and recurrent costs arising from the project would be taken into consideration when determining fees and charges in accordance with “polluter pays” principle.

### **INCREASE IN COST ESTIMATE**

14. The initial estimate presented in the 2010 discussion paper was an indicative figure based on an initial, broad-brush scheme. The main reasons for the differences between the latest project cost and the initial indicative estimate include –

- (a) Significant increases in the costs of capital works projects in recent years since 2010. For instance, the Building Services Tender Price Index has increased by over 65% in the past few years;
- (b) In detailed designs, additional provisions were identified to provide sufficient and robust treatment capacity to meet the service level requirements for continuous 24 hour operation of the facility in normal and anticipated circumstances of scheduled maintenance, overhauls, variation in quality of incoming food waste, and

inclement weather conditions. These requirements include the provision of pre-treatment facilities to render the food waste suitable for anaerobic digestion; increased waste water treatment requirements; and increased waste treatment and office floor areas to meet operational requirements;

- (c) As a result of a detailed site condition study, natural terrain and slope protection cum mitigation works have been proposed. Additional environmental mitigation and monitoring measures have also been identified to meet the recommendations in the environmental impact assessment study;
- (d) Design of the combined heat and power generators and associated control system for export of surplus electricity could only be finalized after the amount of surplus electricity available for export has been ascertained in the detailed design of the treatment facility; and
- (e) Consultants' fees for contract administration and remuneration of resident site staff.

## **WAY FORWARD**

15. Subject to Members' views, we plan to seek the PWSC's support in April 2014 for upgrading 5172DR to Category A, with a view to seeking funding approval from FC in May 2014.

-----

**Environment Bureau  
Environmental Protection Department  
March 2014**