Paper WMSC 7/06
For discussion

Planning and Development of The Integrated Waste Management Facilities

Purpose

This paper reports to Members on the progress of the planning and development of the Integrated Waste Management Facilities (IWMF).

Background

2. In April 2002, the Government invited local and overseas companies to submit proposals on treatment technologies for developing the IWMF. A total of 59 Expression Of Interest proposals on various waste treatment technologies were received. An Advisory Group (AG), chaired by the Permanent Secretary (Environment) and made up of non-officials including academics and professionals, was set up to assist and advise the Government in selecting the most appropriate technologies. After evaluating the proposals, the AG recommended that the IWMF should adopt a multi-technology approach so that the most suitable technology could be applied to deal with different waste streams of municipal solid waste (MSW).

3. In December 2005, the Government promulgated "A Policy Framework for the Management of Municipal Solid Waste (2005 - 2014)" (Policy Framework). This document sets out various waste management initiatives and targets, including the development of the IWMF. One of the key targets is to commission the first phase of the IWMF in mid 2010s subject to the implementation of the "polluter-pays" principle.

4. In response to the Policy Framework, the Advisory Council on the Environment (ACE) held an open forum in January 2006 to discuss and exchange views with stakeholders and the public. In March 2006, a delegation of the ACE visited some advanced waste treatment facilities in

the Netherlands and Germany to acquire more information and understanding of overseas experience and technologies on MSW management and treatment. The ACE discussed the study tour report (ACE Paper 10/2006) on 15 May 2006 and supported the delegation's recommendations (ACE Paper 11/2006).

A Multi-technology Approach

Technology Mix

6. In line with the recommendations of the AG, the Policy Framework sets out the following waste treatment technologies to be adopted for the IWMF -

(a) Biological Treatment - including composting and anaerobic digestion which would treat biodegradable materials such as food waste from commercial and industrial establishments;

(b) Mechanical-Biological Treatment (MBT) - comprising mechanical and biological processes which recover recyclable materials and treat biodegradable fraction from mixed waste;

(c) Thermal Treatment – incinerating the unavoidable mixed waste not handled by biological treatment or MBT and recovering the energy contained.

7. In considering the above recommendations, the ACE affirms that state-of-the-art thermal technology with waste-to-energy opportunity should be used as the core treatment technology for the unavoidable and non-recyclable waste. It further agrees that composting of MSW is only viable for source-separated food waste generated from commercial and institutional sources. However, in view of the experience gained in other major cities e.g. Germany, the ACE has reservation on the use of MBT which requires comparatively large areas and has the potential to cause serious odour and dust nuisances, The ACE therefore concludes that MBT should not be used to treat un-sorted and mixed MSW in Hong Kong. Instead, the IWMF should be limited to employing mechanical sorting and recycling for source-separated mixed recyclable waste. As such, it is proposed that the treatment technologies of the IWMF should be refined as

follows -

(a) Biological Treatment with composting and/or anaerobic digestion;

(b) Mechanical sorting and recycling;

(c) Thermal treatment with state-of-the-art incineration possessing waste-to-energy opportunities.

Development Scales

9. The Policy Framework sets out three specific waste management targets to be achieved in the next ten years -

Target 1 - Reduce the amount of MSW generated in Hong Kong by 1% per annum up to the year 2014, based on the 2003 levels.

Target 2 - Increase the recovery rate of MSW to 45% by 2009 and 50% by 2014.

Target 3 - Reduce the total MSW disposed of in landfills to less than 25% by 2014.

10. It is evident that even if we can reduce the amount of MSW generated in Hong Kong by 1% per annum and increase the recovery rate to 50% by 2014 in accordance with the targets of the Policy Framework, the amount of MSW requiring treatment and disposal by then will still be significant and no less than 7,200 tpd. As such, the minimum total treatment capacity of the IWMF will be in the order of 3,600 tpd, assuming that the MSW disposed of in landfills will be limited to less than 25% of the total amount generated to conserve the landfill space. It should be noted that if the landfills are to be further conserved with more MSW to be diverted for treatment at the IWMF, the total capacity of the IWMF will have to be increased to beyond 3,600 tpd.

11. In the course of our promulgation of the Policy Framework, we have heard and taken note of the concerns expressed by some stakeholders on possible over-sizing of the IWMF, especially for the incineration plant.

There are also suggestions of developing a smaller incineration plant to demonstrate its environmental performance and gain public acceptance in the initial stage. We believe that by adopting modular design and developing the IWMF in phases as proposed in the Policy Framework, there will be sufficient flexibility to address these concerns. Depending on the progress of the waste reduction measures and the effectiveness in reducing the volume of unavoidable waste, we will review the MSW generation pattern before confirming the size of each development phase. However, for the purpose of planning at this stage, we need to adopt the minimum capacity of 3,600 tpd as the development parameter for the IWMF.

Technology Components

12. On the basis that the IWMF will be designed to treat 3,600 tpd of the MSW, the capacities of its individual components will have to be determined. Taking into consideration the relevant factors, we have arrived at the following recommendation -

Overall IWMF Treatment capacity (tpd)	**Component Capacities (tpd)**		
	Biological Treatment	**Mechanical Sorting and Recycling**	**Thermal Treatment**
3 600	500	500	2 600 (To be developed in phases and by modules)

13. The proposed 500 tpd biological treatment plant is to take care of the food waste generated from the commercial and industrial sectors and to ensure that the products produced as soil conditioners can be consumed by local markets. As for the mechanical sorting and recycling plant, while a large scale plant is technically feasible, in view of its comparatively large per unit treatment area requirement and the uncertainties concerning the qualities and available market outlets of the sorted recyclables, we do not recommend to build a plant greater than 500 tpd, at least in the initial stage. The remaining 2,600 tpd of MSW would then need to be dealt with by thermal treatment.

The Way Forward

14. Given the imminent need to address the shortage of landfill capacity, we plan to start a site search exercise making reference to the principles and criteria previously agreed by the AG (Annex A). To kick start the exercise, we will initiate a search for available sites for the IWMF with capacities and components as detailed above. The component facilities will be co-located as far as possible and the potential sites should be adequately large and suitable for further development to reach the possible full scale in future.

Annex A

15. We estimate that the site search exercise would take 10 - 12 months. Further feasibility studies and environmental impact assessments would be carried out after the site search result is available.

Advice Sought

16. Members are invited to comment and agree on the recommended way forward as described in paragraphs 14 and 15 above.

Waste Management Policy Division
Environmental Protection Department
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Annex A

Principles of Site Search for Developing the IWMF

The following areas are not recommended by the Advisory Group on Waste Management Facilities (AG) for the development of the IWMF

- All areas for Residential and Commercial Use;
- All 23 existing or potential Country Parks;
- All existing or potential Marine Parks and Marine Reserves;
- All Special Areas (outside Country Parks);
- All Sites of Special Scientific Interest (SSSI) (including buffer areas);
- All Restricted Areas (Wildlife);
- The RAMSAR Site (including buffer area);
- All Green Belt (GB) and Urban Fringe Parks;
- All Conservation Areas (CA);
- All Coastal Protection Areas (CPA);
- All Water Gathering Grounds
- All Wetlands Areas
- All Fish Culture Zones
- All Proposed Fisheries Protection Areas
- All Gazetted Beaches
- All Declared Monuments, Graded Historical Buildings and Structures, Deemed Monuments and Archaeological Sites
- All Cemeteries, Burial Grounds or Grave zones
- All Fairways and Shipping Lanes and Port Areas;
- All Airport and Restricted Areas around it (including the Military Airport);
- All Tunnels and Roads, existing and proposed Railways;
- All Other Major Infrastructure (including Castle Peak Firing Range);
- All Major Tourism Development Areas; and
- All Priority Sites for Enhanced Conservation promulgated under the New Nature Conservation Policy.

The AG has agreed the following evaluation criteria for potential IWMF sites.

Major Criteria	Environmental	Technical/ Engineering	Economics	Social	Consumer & User
1. Air Quality	√				
2. Noise	√				
3. Visual and Landscape	√				
4. Ecology	√				
5. Drainage & Water Quality	√				
6. Land Use				√	
7. Land Ownership				√	
8. Traffic Impact				√	
9. Community Impacts				√	√
10. Ease of integration with existing or planned MSW infrastructure		√			√
11. Site Access		√			
12. Constraints to Site Layout		√			
13. Utilities		√			
14. Construction Duration		√			
15. Construction Risk		√			
16. Operational Risk		√			
17. Capital Cost			√		√
18. Operating Cost			√		√
19. Opportunity Cost of Land			√		