

17 March 2014

Ms Mandy Poon
 Clerk to Panel on Environmental Affairs
 Legislative Council Secretariat
 2/F Legislative Council Complex
 1 Legislative Council Road
 Central
 Hong Kong

By mail and e-mail (mpoon@legco.gov.hk)

Dear Ms Poon,

Submission of a Paper on the “Environmental Infrastructure Projects”

While Hong Kong is facing the dual challenges of capacity saturation of existing landfills for waste disposal and yet at the same time an increasing demand of waste, it is imperative that Hong Kong should explore options to meet its effective waste management target. The Hong Kong Green Building Council (HKGBC) supports the gradual implementation of action agenda as proposed in the Blueprint for Sustainable Use of Resources 2013-2022 by the Environment Bureau. The HKGBC believes a long term, holistic and sustainable waste management strategy and plan covering waste reduction at source, waste separation, waste recycling as well as end treatment of waste is instrumental in alleviating the solid waste problems in Hong Kong. While landfilling erstwhile has been the solid waste disposal practice in Hong Kong, however, with an anticipated 10,000 tonnes of waste requiring disposal every day in 2017 coupled with the three existing landfills to have reached their current capacities one by one by 2019, the need for extension of existing landfills together with the development of modern waste-to-energy facilities to treat municipal solid waste (MSW) is high.

For the existing landfill extension in the three sites, the restoration of existing Southeast New Territories (SENT) landfill will provide substantial intermediary buffer with greenery between residential development and the operating landfill, and the restriction to only construction waste disposal to the landfills will reduce the impact on surrounding residents. Apart from these, the Government has undoubtedly a crucial role in promoting Reduce, Reuse and Recycle of construction and demolition waste that we mostly concerned. Our proposed recommendations are as follows:

1. Reduction at source including proper design, planning and co-ordination, procurement and co-ordination among all team members of a project to optimise material consumption, for example by the use of the BIM tool; as well as incorporating through source separation of construction waste during the design stage and construction process;
2. Reuse of demolition products and unused construction materials is necessary. A proper information sharing platform shall be provided for the construction industry to share the availability of demolition / unused materials for others to use; and
3. Recycled construction material should be made in good use e.g. eco-block and recycled aggregates and it would be very much encouraging if part of the \$1 billion Recycling Fund will be earmarked to support the recycling industry in developing recycled construction material and relevant technical specification.

We sincerely hope that the Hong Kong SAR Government will consider the above recommendations and take action on devising policy and market initiatives in order to make this a success.

For the integrated waste management facilities (Phase 1), there is no doubt that complete incineration technologies are required to minimise the emission of toxic substances and energy consumption. Moreover, with flue gas treatment and discharge system, and a desalination plant, environmental impact can also be reduced.

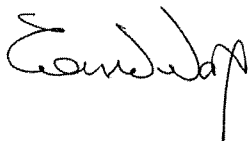
As compared with other incineration systems, we agree that mass burning moving grate system* is more suitable to be adopted in Hong Kong due to its reliability, low environmental impact, and relatively low consumption of land area and manpower for pre-processing on MSW. Technologies in the advanced moving grate incineration not only help handle 3,000 tonnes MSW each day and reduce the volume of MSW, but also turn waste-to-energy as a renewable energy source, reduce greenhouse gas emissions from power generation and reduce emission of toxic gases to meet the highest European Union's Standard. This approach is similar to other incinerators around the world including The Netherlands and Sweden to prove its substantial proven track record and performance. This technology thus minimises the impact on the surrounding residents and can be part of the community services such as amenities for leisure, business and community convention services, and educational purposes, be an asset to the nearby neighbourhood.

The Hong Kong SAR Government should present the incinerator as not just a solid waste processing facility but as a community asset to serve the community in other areas and even integrate the incinerator with the local community similar to those for example in Japan, Taiwan and Denmark. Last but not the least, we would like to recommend in addition to make use of the electricity in the operation of the incineration plant, but also the surplus electricity may be considered to be fed into the power grid and supplied to nearby community services. This can generate and provide electricity which in the long run can help reduce costs. Thus, this will be beneficial to the community.

We hope the above would convey the strong commitment of HKGBC in facilitating Hong Kong and in particular, the Government in the waste management strategy on the Environmental Infrastructure Projects. Sharing the same vision to foster the sustainable development in Hong Kong, HKGBC will join hand in hand with the Government to face the challenges ahead and make Hong Kong a better place for our future generations to live.

Yours Sincerely,

Hong Kong Green Building Council Limited



Ir Conrad Wong, BBS, JP
Chairman

*Encl: Technical information on moving grate incineration technology

Technical information on “Environmental Infrastructure Projects” - Incineration

Mass Burning (Moving Grate) System

It is a typical incineration technology meeting the European Union’s standard and using in The Netherlands, Taiwan, Korea and Japan. The moving grate enables the movement of waste through the combustion chamber to achieve a more efficient and complete combustion.

According to the European Waste Incineration Directive, combustion is enhanced by following the guideline of high temperature, increased turbulence exposes more waste surface, and a longer residence time for the flue gas and the MSW to increase burnout. Thus, incineration plants must be designed to ensure that the flue gases reach a temperature of at least 850 °C for 2 seconds in order to ensure proper breakdown of toxic organic substances. In order to comply with this at all times, it is required to install backup auxiliary burners (often fueled by oil), which are fired into the boiler in case the heating value of the waste becomes too low to reach this temperature alone. Excess air is supplied through the grate from below. This air flow has the purpose of cooling the grate itself, complete combustion of waste and prevention of dioxins and carbon monoxide formation.

The flue gases are then cooled in the superheaters, where the heat is transferred to steam, heating the steam to typically 400 °C at a pressure of 40 bars for the electricity generation in the turbine. At this point, the flue gas has a temperature of around 200 °C, and is passed to the flue gas cleaning system. Flue gas treatment and discharge system with dry/semi-dry scrubber, power activated carbon injection, bag filter and selective catalytic reactor for removal of acid gas, mercury and dioxin, particulates and NOx respectively.

Table 1 Advantages and Disadvantages of Moving Grate Technology

Type of Incineration Technology	Advantages	Disadvantages
Mass Burning (Moving Grate)	The technology is widely used and thoroughly tested for waste incineration and meets the demands for technical performance.	Capital and maintenance costs are relatively high.
	It can accommodate large variations in waste composition and calorific value.	
	Allows for an overall thermal efficiency of up to 85%.	
	Each furnace can be built with a capacity of up to 1,200 t/day	
	No need for prior sorting or shredding.	

In Korea, the average dioxin emission and total dioxin emission in 2010 with the use of moving grate system were minimized to below the international emission standard limit for dioxin concentration in flue gas of 0.1 ng I-TEQ/m³. The plants in the Netherlands, Sweden, Austria and Germany also have to comply with a dioxin emission limit of 0.1 ng I-TEQ/m³.

Refuse-derived-fuel System

Another commonly used combustion technology is Refuse-derived-fuel (RDF) burning. RDF is an alternative technique for a more homogenous fuel derived from MSW for the combustion process, it is a fuel produced by shredding and dehydrating solid waste. RDF consists largely of combustible components of municipal waste.

E.g. South Korean Government has sought to build an “Environmental Energy Town” in Sudokwon landfill site, which is to be equipped with RDF manufacturing facilities and other waste-to-energy facilities.¹

¹ The site is designed to operate on a self-sufficient basis through the conversion of waste resources and biomass to energy, and is expected to turn into an international environmental tourist spot after full implementation of the related facilities.

Table 2 Advantages and Disadvantages of RDF Technology

Type of Incineration Technology	Advantages	Disadvantages
Refuse-Derived-Fuel (RDF)	A more homogenous fuel derived from MSW for the combustion process	Pre-processing is needed to separate combustibles from non-combustibles MSW
	High heat release intensity	Investment capital, land area and manpower consumption are relatively high for RDF preparation
	Smaller flue gas quantities, therefore, smaller and less costly air pollution equipment is needed	Increase in mass and volume of residue for landfill

Examples of Incinerators worldwide

1. MSW incinerators in the centre of community complexes with indoor gardens, meeting halls, shops and offices of NGOs in Japan cities
2. At the Beitou Refuse Incineration Plant in Taipei, there are observatory, revolving restaurant and community convention centre on the 120m-tall chimney to attract visitors
3. A waste-to-energy incineration plant with an artificial ski slope on the roof in Copenhagen is planned and will be completed in the near future
4. In UK, the wasted warmth from the Whitley incinerator is used to heat city centre buildings and Southampton City Council planning to pipe heat from Marchwood Incinerator
5. Thermal power incineration plant in the centre of the city of Vienna decorated by artist