WASTELINE : WINTER 2013 / 2014

The Newsletter of the Hong Kong Waste Management Association
Web Site: www.hongkongwma.org.hk

Message from the Editor: This Newsletter requires your participation. We would like to hear your experiences in implementing good waste management practices in Hong Kong or overseas. If you have an interesting story to tell, please write to me at barry_adcock@sita.hk

HKWMA 20th Anniversary Dinner

One of the highlights of the Association's year in 2013 was the 20th Anniversary Dinner held in the Junior Ballroom of the Royal Plaza Hotel in Mongkok on Thursday, 21 November. The dinner was timed for the evening before the 7th Two-Coasts Forum to allow our guests from Mainland China, Taiwan and Macau to attend the dinner and join us in celebrating 20 years of the Hong Kong Waste Management Association. As well as the guests from overseas, the Association was honored to welcome many distinguished guests from Hong Kong including Secretary for the Environment, Mr. K. S. Wong, the Under-Secretary for the Environment, Ms. Christine Lo, the Legislative Council member for the Engineering Functional Constituency, Ir. the Honorable Dr. W. K. Lo and Ir. Raymond K. S. Chan, President of the Hong Kong Institution of Engineers.

On arrival, the members and guests were greeted by a very efficient welcoming team from the Young Members' Chapter of the Association.

The HKWMA Chairman with the YMC Welcoming Team

As they registered, all members and guests were presented with a special 20th Anniversary Commemorative Book which had been prepared by the Association to mark the occasion.

The 20th Anniversary Commemorative Book

In recognition of the special occasion, the Association had also arranged special commemorative wine to accompany dinner.

Special Commemorative Wine for the 20th Anniversary

After pre-dinner cocktails, at which there was adequate opportunity for networking and catching up with friends and colleagues, some of whom had not met for several years, the Chairman of HKWMA, Ir. Barry Lee, in his introduction to the occasion welcomed his distinguished guests, both from Hong Kong and overseas, and encouraged all those who were able to attend the Two-Coasts Forum the following day. The Chairman introduced the Guest of Honour, the Secretary for the Environment, Mr. K. S. Wong, who then gave a short address before dinner on the subject of "Waste No More".

The SEN giving his address before dinner

The Secretary stressed the importance of tackling the problem of food waste in Hong Kong and compared Hong Kong's performance in waste minimization unfavorably with other similar Asian cities. He confirmed Government's intention to push forward with waste charging which other cities in Asia had introduced successfully. The Government would be carrying out further consultation and trials in Hong Kong with the intention of reducing the amount of MSW produced by 40% by 2020. The Secretary acknowledged that the public were expressing a lot of reservations about extending the landfills and building the first incinerator but the time had now come

WASTELINE : WINTER 2013 / 2014

The Newsletter of the Hong Kong Waste Management Association
Web Site: www.hongkongwma.org.hk

to perservere to gain approval for these facilities before the existing landfill capacity was exhausted. Waste minimization and landfill extension were especially important when it was remembered that the completion of the first proposed waste-to-energy incinerator at Shek Kwu Chau would take 8 years to complete and could not therefore be in operation before 2022.

During dinner, the present and past chairpersons of HKWMA who were able to attend the celebration were presented with commemorative medals.

The Secretary and the Under-Sectary of the Environment with current and past Chairpersons of HKWMA proudly wearing their medals

During the dinner, the members of the Executive Committee of the Association toasted all the members and guests.

Association Executive Committee toasting the members and guests

The Junior Ballroom was packed for the event and everyone had a thoroughly enjoyable evening.

"EXCO and YMC" Committees

A great deal of the success of the evening was down to the hard work of the Chairman, Ir. Barry Lee, and the members of the YMC Committee to whom a vote of thanks is due.

The Chairman with the members of the YMC Committee

Reported by Barry Adcock

Editorial
"Blueprint Update : where are we now?"

In May 2013 the Environment Bureau produced its "Hong Kong, Blueprint for Sustainable Use of Resources, 2013 – 2022" (the "Blueprint") outlining Government's proposals for the management of waste in Hong Kong for the following ten years. As nearly one year has passed since the Blueprint's release, now is an appropriate time to review progress.

By common consent among those who have studied the Blueprint, it is a cogent and concise statement of the Government's waste management strategy for the next ten years. As was reported in the Spring 2013 Edition of Wasteline, the Blueprint was released only a few days before the Association's Spring Reception and a very useful "question and answer" session took place at the Reception between the members present and the Under-Secretary for the Environment, Ms. Christine Loh. To summarize members' opinions expressed during that session :

- Many of the proposals in the Blueprint were repeats of initiatives announced by Government ten and twenty years previously which had come to nothing : why should anybody believe that this time Government would carry through their initiatives to successful completion?; and

WASTELINE : WINTER 2013 / 2014

The Newsletter of the Hong Kong Waste Management Association
Web Site: www.hongkongwma.org.hk

* Public opposition to the extension of the SENT Landfill was so strong that if Government continued to bundle the extension of SENT with the extension of the other two landfills, then it was probable that the proposals for all three extensions would fail to receive approval and all this for only a small increase in void space at SENT.

Under-Secretary Loh responded by saying that Government was determined to "join up the dots" to make sure that Hong Kong had a comprehensive waste management system, that the Government had "stuck its neck out" by setting firm targets together with target dates for their achievement and that, as the existing landfills reached capacity, there was no time to formulate new plans if the present Blueprint was not carried through to a successful conclusion.

In the eleven months since the 2013 Spring Reception, some of the points raised have been repeated in letters to the press, editorials and statements from interested parties. The Blueprint has been accused of being "old wine in new bottles". However, it should be remembered that this description is not necessarily a criticism if the "old wine" is of fine quality which improves with age and if the "new bottles" come in the form of Secretary for the Environment, Mr. K.S. Wong, and Under-Secretary, Ms. Christine Loh, who are new to Government with proven environmental credentials and who, with support, can inject new objectivity into the process of achieving actual implementation of the strategy set out in the Blueprint.

Unfortunately, it has to be conceded that, despite intense lobbying, Legislative Council approval for the Blueprint remains elusive, particularly in obtaining approval for the "Three Plus One" package for extensions to the three existing landfills and construction of the first new waste-to-energy incinerator. Letters to the papers and comments by LEGCO members make it clear that to achieve success, this time Government must implement the whole plan set out in the Blueprint, going ahead with all initiatives at once. They fear that if the landfill extensions and the first incinerator are approved then Government will soft pedal on the other essential items of the Blueprint such as the introduction of waste charging, Producer Responsibility Schemes and support for the recycling industry.

In this last respect it is encouraging to note the promise of HK$1 billion in Government funds made in the Chief Executive's Policy Address this year to actively assist the recycling industry. Similarly after decades of repeat consultancy studies and public consultations, there is general acceptance by the public that charging for the disposal of municipal solid waste is justified and will provide a much needed incentive for the public to reduce, reuse and recycle (the "3Rs") materials to minimise the waste requiring final disposal. The beginning of trials at a number of public and private estates to compare the effectiveness of different proposed methods of charging for domestic waste is particularly welcomed. On the other hand, there seems to be no good reason why the systems introduced in 2006 to charge for the disposal of construction waste at landfills could not quite easily be extended to commercial and industrial (C&I) waste, thereby encouraging greater attention to the "3Rs" in those sectors.

Through the discourse of the past few months it can be seen that everyone accepts that all parties in Hong Kong need to join Government in implementing the Blueprint. However, members of LEGCO and the general public are now far more knowledgeable and militant about these matters than they were in years gone by. Government therefore needs to be more open in its advocacy of the Blueprint. Trying to bulldoze through landfill extensions and construction of the first incinerator is unlikely to be successful.

Information set out in the Blueprint represents a more open approach by Government than has been the case in the past. For instance, figure 3 on page 6 of the Blueprint shows the details of the utilization of Hong Kong's three strategic landfills up to 2011. By liner extrapolation of the data given in this figure, it can be estimated that the landfills will be filled in 2015 (SENT), 2030 (NENT) and 2031 (WENT). This extrapolation is at historic rates of waste filling including the greater quantities of construction waste that were sent to the landfills before the introduction of construction waste charging in 2006. As a very important part of the Blueprint is the target to reduce the MSW disposal rate by 40% by the year 2022, it can be expected that the life of the landfills will be even longer. While this extrapolated remaining landfill life should in no way give cause for complacency it does afford sufficient time to bring along all stakeholders in the smooth and continuous implementation of the Blueprint.

It cannot be denied that landfill capacity will be required indefinitely. Notwithstanding the success of the "3Rs" and the reduction in the volume of non-recyclable waste by incineration, there will always need to be landfill space available for final disposal of residues. Landfill extensions for Hong Kong will therefore certainly be required in due course.

WASTELINE : WINTER 2013 / 2014

The Newsletter of the Hong Kong Waste Management Association
Web Site: www.hongkongwma.org.hk

As far as thermal treatment to recover energy from waste is concerned, there has been a great deal of adverse comment in public forums and in the press about the proposed construction of the first such facility at Shek Kwu Chau using mass burn moving grate incineration technology. Whilst a great deal of the comment has been the result of misconceptions and is often without merit, the public's concerns need to be addressed.

Following the SEN's recent trip to Europe with selected members of LEGCO to visit plants in several countries using different thermal treatment technologies, the case for the proven moving grate technology has been made in preference to processes which are theoretically technically superior but which are as yet largely unproven.

The proposed siting of the facility has engendered even more opposition as evidenced by a steady stream of letters to the papers and submissions to public forums, (some of which have been copied to your newsletter). The writers find it difficult to understand why Government proposes to build a waste-to-energy incinerator in an unspoilt marine environment at Shek Kwu Chau rather than on a site at Tsang Tsui where the land has already been reclaimed in a sparsely populated area already designated for waste disposal and other industrial facilities. Government's main response has been that the siting of the incinerator is part of their policy to ensure "Balanced spatial distribution of waste facilities" which some see as a euphemism for "Spreading the pain around" : a policy which correspondents point out ignores the established principles of town planning whereby unpopular facilities are sited in designated areas away from centres of population and areas of high ecological value. Some correspondents have even suggested that the choice of site is the result of an agreement between Government and New Territories power brokers.

Be that as it may the Blueprint remains a comprehensive sensible document and the last chance to give Hong Kong the comprehensive waste management system it deserves. The experience of the past few months shows, however, that the Government needs to be more candid and open with the public, and particularly LEGCO, to ensure that the whole plan can be taken forward holistically. If Government proceeds in such a way the continued support of the HKWMA and the waste industry will be assured.

Incineration Explained at Spring Reception

Once again, the Spring Reception in the Hong Kong Club, on 7th April 2014, proved very popular. The Chairman of HKWMA, Mr. Barry Lee, welcomed over 80 members and guests to the function.

After an initial cocktail reception, the Chairman introduced the guest speaker for the evening, Professor Irene Lo, who had come to talk about her experiences in waste incineration and to introduce the "Alliance for Promoting Sustainable Waste Management for Hong Kong" (the "Alliance").

Professor Lo commenced her talk by introducing the Alliance which had been established on 23rd November 2013 by a group of 58 experts, academics and professional bodies. A news conference had been held at the Alliance's establishment. It received good coverage in the press which had been continuing, particularly with regard to the technologies and policy regarding waste management in Hong Kong. The Alliance was stressing the four key elements for waste management in accordance with the established waste hierarchy; from avoidance, through re-use, recycling and recovery to final disposal of residuals. The Alliance was strongly urging the Government to introduce waste charging to provide an incentive for waste reduction and to expedite Producer Responsibility Schemes (PRS) for plastic bags, packaging, glass bottles and waste electrical and electronic equipment (WEEE).

With regard to the choice of technology for "Waste to Energy" incineration, the Alliance agreed that the moving grate system was the most reliable. The Alliance was supportive of using part of the income made from the sale of power generated from the incineration of waste to help people affected by new waste facilities.

With regard to the landfill extensions, the Alliance had asked the Government to review the total landfill capacity needed to satisfy their Blueprint and to introduce the extensions one by one while keeping the need for further capacity under continual review.

Professor Lo then moved on to the main part of her talk about the different technologies available for the incineration of municipal solid waste (MSW). In broad terms, there were four types of technology used for transforming waste to energy : Incineration, Gasification, Plasma Gasification and Pyrolysis. Except for the first technique, incineration, all these methods

required waste pre-treatment and very high temperatures. The last three methods produced a synthetic gas, colloquially known as "syngas", but also produced by-products including tar, ash, slag, vitrified slag and oil.

There were over 2,000 plants worldwide for the thermal treatment of waste to produce energy. Many of them were in Europe and Japan which had very stringent environmental regulations governing the operation of the plants. Of these 2,000 plus plants 15 no. used the Plasma Gasification process and of those only four treated MSW. Other gasification techniques were used in about 100 no. plants of which the largest could treat a maximum of about 500 tonnes per day. Similarly, there were 25 no. plants using pyrolysis of which the largest could treat only 100 tonnes per day. The first waste-to-energy plant proposed for Hong Kong was required to treat 3,000 tonnes per day, which should generate about 480,000 MW hr per year of electrical power (i.e. a mean output of 60 MW).

Of recent plants worldwide using the latest technologies available, 90% used moving grate technology. The largest at present in operation treated 4,400 tonnes per day, in Amsterdam. Over 100 new plants had been built using moving grate technology since 2002. As no pre-treatment was required for the waste before incineration, it saved land area for the plant. Drawbacks to moving grate incineration were treating the flue gas and disposing of the fly and bottom ash. On the other hand, advantages included there being over 10 major suppliers of the technology which leads to good price competition at tender time and with modern flue gas treatment techniques, there was no reason why incinerators should not be sited in downtown areas as they were, for instance, in Amsterdam and Copenhagen which were particular examples sited by Professor Lo, the one in Copenhagen even having a ski slope on its roof. Although some pressure groups continued to express worries about the flue gas pollutants, modern incineration plants controlled the temperature to over 850 ^{o}C, employed high turbulence combustion and ensured over 2 seconds retention time for the hot flue gas. These precautions ensured that all organic materials were destroyed during the incineration process. Also the flue gas treatment part of the plant was maintained under negative pressure, so that in case of any possible impairment of the containment envelope, no flue gas would escape. This precaution also helped control any odour. Flue gas treatment also included lime scrubbers, selective catalytic reduction (SCR) to convert nitrogen oxides to nitrogen, activated carbon to absorb any metals and dioxins and a filter bag house to remove fly ash from the flue gas.

Data from modern operating plants around the world showed emissions of harmful pollutants to be extremely low and in most cases well below the designed standards. Many learned papers had been published, summarizing the emissions from incinerators and showing them to be well within European standards and with a risk-to-health well below occupational risk limits. People should not be put off by the experience of the three old technology incinerators that were previously in use in Hong Kong in Kennedy Town, Kwai Chung and Tsuen Wan and which were closed progressively between 1990 and 1997. Those plants were almost continuously emitting smoke. Professor Lo stressed that this was very old technology. It did not happen with the new plants. As an example Singapore was smaller than Hong Kong and therefore land was scarcer but it operated four incineration plants.

Plasma Gasification had been gaining a lot of press coverage recently with various special interest groups requesting the Government to give this technology due consideration in view of their perception of the pollution emitted by moving grate incinerators, notwithstanding all the evidence summarized above (to the contrary, for new plants at least). At present, there were only four Plasma Gasification plants treating MSW of which the biggest had been of 220 tonnes per day capacity in Japan. The technology used in Plasma Gasification was to form an electric arc to ionise the pre-treated waste at very high temperatures in an anoxic environment to produce syngas which had a very high calorific value and was made up mostly of carbon monoxide, hydrogen and methane. By-products of the process were vitrified slag which was inert and could be used for aggregate in certain applications. Drawbacks of the technology were that it had a very limited track record to-date and that pretreatment of waste was required which meant the land requirement for the plant was increased. Plants in use so far had been very small and much of the power generated was required for striking the plasma arc. In addition, the syngas produced needed to be cleaned before use. The existing four MSW plasma plants had capacities of 11, 28, 85 and 220 tonnes per day of which the largest, in Japan, was shut down in 2012. A new plant of 950 tonnes per day capacity was now under construction in Tées Valley in the UK and was expected to be commissioned in the third quarter of 2014. It was expected that this plant would produce a total of 50 MW of electrical power of which 13 MW would be used to power the plasma arc leaving a nett power output of 37 MW. The land area required just for the

Plasma Gasification plant was 6 hectares and this didn't include the area required for pre-treating the MSW. From the data available, it could be extrapolated that for the same throughput, about three to four times as much land was required for a plasma process (including MSW pre-treatment) as was required for a moving grate incinerator.

Many relevant papers had been published in the last three or four years by reputable organizations including the International Solid Waste Association (ISWA), the Governments of Australia, Scotland and Canada and Columbia University in the United States. Some of the principal conclusions of these reports were that "there is little or no information available on the operational performance of Plasma Gasification plants", "there are unquantifiable risks from the very high temperatures (several thousand ^{o}C) that are involved in Plasma Gasification", "the maintenance costs of Plasma Gasification plants are expected to be high", "a large area and investment is needed for MSW pre-treatment prior to Plasma Gasification" and "all the new alternative technologies demonstrated so far are inferior to conventional 'Energy from Waste' technologies".

Professor Lo with members of Exco

Professor Lo summarized by saying that maybe one day Plasma Gasification would have a place in MSW treatment as the technology developed but for now in Hong Kong, with its particular problems, moving grate incineration was by far the best bet. Professor Lo ended her talk by saying that during the remaining part of the reception she would be pleased to answer any questions members and their guests might have.

The YMC committee members with Prof. Lo and Exco members

The Chairman, Barry Lee, thanked Professor Lo for her succinct summary of the incineration technologies in use in the world today and invited her to join members and their guests in the networking session that followed.

Reported by Barry Adcock

AGM Returns to Hong Kong Club

After moving to Causeway Bay the previous year, while the Hong Kong Club underwent renovations, the Association's Annual General Meeting (AGM) returned to its traditional home in 2013 on the evening of 23 September.

After cocktails, HKWMA Chairman, Mr. Barry Lee, commenced the AGM at 19:00 hours by welcoming the over 80 members who were present and in particular Dr. W.K. Lo, Legislative Council Member for the Engineering Functional Constituency as the Guest of Honour for the evening. After the Minutes of the previous year's AGM had been approved, the Chairman gave his report of the Association's work in the previous year during which 16 no. activities were organized. A PowerPoint presentation of the Chairman's Report was subsequently placed on the Association's website for members' reference. The Chairman noted that the membership of the Association was approaching 200 and that the Young Members' Chapter (YMC) comprised 21 Individual Members of whom 16 were ladies. The Chairman suggested that more young men working in our industry should make the effort to support the Association's Young Members' Chapter.

WASTELINE : WINTER 2013 / 2014

The Newsletter of the Hong Kong Waste Management Association
Web Site: www.hongkongwma.org.hk

Looking ahead the Chairman noted that a special dinner to mark the 20th Anniversary of the Association would be held on 21 November 2013. Of the 20 tables available, 16 had already been booked so he advised members to secure their places quickly or possibly lose the chance to attend what promised to be a memorable evening.

Members were reminded that this year it was Hong Kong's turn to host the Two Coasts Forum. Final preparations were being made for the event which would be held at the HKPC on 22 November 2013. Large contingents of our colleagues from the Mainland, Taiwan and Macau were expected to attend so the Chairman asked the Association's members to make sure that they were given a friendly welcome.

On financial matters, the Chairman noted that the Association's present surplus of HK$555,159 was being carried forward to the following year and that some of the surplus would be spent to ensure the success of the 20th Anniversary Dinner and associated events.

The AGM then moved on to the election of new Executive Committee members. It was noted that four retiring members had offered themselves for re-election and as there had been no other nominations, the four retiring members were elected to fill the four vacancies on the committee. It was noted that the five co-opted members of the Executive Committee had agreed to continue their service. The meeting confirmed the Executive Committee's decision that in view of his excellent performance in his first year as Chairman, Mr. Barry Lee would continue as the Association's Chairman for a further year.

The Chairman and Vice-Chairman with members of YMC

The AGM ended at 19:25 hours.

Following the end of the AGM the Chairman presented Membership Certificates to Corporate Members who had registered for the coming year. The Chairman then handed the floor to the convenor of the YMC, Ms. Kitty Lee, who introduced the winners of the Student Video Competition. The Guest of Honor, Dr. W. K. Lo, presented the prizes to the three winning teams. A detailed account of the Student Competition may be found in another article in this edition of Wasteline. Members were advised that the winning videos could be viewed on a laptop set up on the reception desk.

The Chairman then introduced LEGCO Member, Dr. W. K. Lo, who is also Chairman of the recently established Hong Kong Green Strategic Alliance, to address the assembled members and guests. Dr. Lo started off by congratulating the Association on its 20th Anniversary. He then made his presentation on "Waste Management in Hong Kong – the Challenges".

Dr. Lo reminded everyone that Hong Kong was a very small place and with 7 million inhabitants it was a very crowded place. Unfortunately, it had an alarming unit production rate of waste of some 1.36 kg per head per day which was the highest in the region. As a result Hong Kong produced 13,000 tonnes of waste per day. The major problem with this rate of waste generation was that Hong Kong was still relying on the three strategic landfills alone and that according to Government figures, all three would be filled in six years' time. Whilst there had been a lot of talk about incinerators, no high technology, modern incinerators had yet been built in Hong Kong even though there were many in Mainland China. Government's present proposal for an incinerator at Shek Kwu Chau, if it were to go ahead, would take eight years to come into operation but the Environmental Bureau had not yet even presented a funding proposal to LEGCO for this facility.

The Hong Kong Government had long recognized the problem facing waste disposal in Hong Kong. Among other documents, it published in 2005 a Policy Framework for the Management of Municipal Solid Waste (2005 – 2014). The Government had now released its Blueprint for Sustainable Use of Resources from 2013 to 2022 which was the subject of an open forum discussion with the Under Secretary

for the Environment, Ms. Christine Loh, at the HKWMA Spring Reception.

Despite the analysis of the problem and the publication of these Frameworks and Blueprints, nothing concrete had been put forward yet by the Government, especially with regard to recycling. Dr. Lo noted that members of LEGCO were meeting the Secretary for the Environment the following day, with members of interested associations, to discuss the problems. Full understanding of the problems and their possible solutions was essential because there was a great deal of political resistance in LEGCO to the funding and construction of more waste management facilities.

In the 2005 Plan, Government mentioned Producer Responsibility Schemes (PRS) for six products including tyres, batteries, waste electrical and electronic equipment (WEEE) and plastic bags. In the eight years that had passed, the only product to be addressed was plastic bags, and that legislation had been passed in 2008, five years earlier. That initiative had proved to be successful and had changed people's personal behaviour with regard to plastic shopping bags. But what was happening about the other identified priority products? For WEEE, for instance, Hong Kong was presently producing 70,000 tonnes per year, a figure which was increasing by 2% annually. Of all this production only about 1% was being processed by a number of NGOs with Government's support. Government's support was essential because the processing of WEEE was an uneconomic process so it needed assistance with land, capital and technical knowhow. To boost this activity, Hong Kong needed to liaise with Guangdong to allow recovered products to cross the border to the larger market of the PRC. At least now Government was recognizing the realities of the situation and as an example had agreed to provide assistance of HK$400 million to set up primary processing centres for WEEE. Support was required for the recycling of other products as well; for instance, glass bottles, of which 250 tonnes were being collected every day which was about 3% of the total daily municipal solid waste.

Dr. Lo then introduced the recently formed Hong Kong Green Strategic Alliance (HKGSA) the main aims of which were to promote environmental protection and foster the environmental industry. One initiative of the Alliance was the setting up of a centre for industrialization and development of environmental protection technologies. It was apparent that the Government was very reluctant to support the development of local technologies so the Alliance's intention was that the centre would take over the Government role and use Hong Kong's advantages over the PRC (like the legal system, including the protection of intellectual property) to develop the environmental industry here.

For the recovery of useful materials from WEEE, however, Hong Kong being a small place had an incomplete supply chain in recycling so cross border co-operation was essential. Dr. Lo considered that the Government should encourage the sale of Hong Kong green products in Mainland China and elsewhere and help the Mainland Government to develop a circular economy. He told his audience about a recently established regional co-operation plan between Hong Kong, Macau and Guangdong on building a quality living area including low carbon initiatives.

The HKGSA was encouraging pilot projects for cross boundary co-operation in the use of recycled materials. It also was instrumental in developing a circular economy. To end his talk, Dr. Lo concluded that "We professionals must take up the initiative because the Hong Kong Government is not ready to".

Ir. the Hon. Dr. W. K. Lo with Exco members after his presentation

Dr. Lo was given a warm round of applause by his audience at the end of his talk, following which the Chairman invited all members and guests to join himself, the Executive Committee and the Guest of Honour to enjoy the excellent service and fare of the Hong Kong Club.

Reported by Barry Adcock

WASTELINE : WINTER 2013 / 2014

The Newsletter of the Hong Kong Waste Management Association
Web Site: www.hongkongwma.org.hk

MISSION TO SOUTH KOREA TO STUDY GREEN TECHNOLOGIES & WASTE MANAGEMENT (29 April – 3 May 2013)

By

The Hong Kong Waste Management Association, the Environmental Division of the Hong Kong Institution of Engineers and the Hong Kong Environmental Industry Association

1. SUMMARY

The Hong Kong Waste Management Association (HKWMA), the Environmental Division of the Hong Kong Institution of Engineers (HKIE Env.D.) and the Hong Kong Environmental Industry Association (HKEnvIA) jointly organized a study mission to South Korea from 29 April to 3 May 2013. The study mission aimed to introduce new insights and practices for tackling Hong Kong's imminent waste problem. Waste management had been one of the top priorities recently for the Hong Kong Government and the Environment Bureau (EnB) issued a new waste management blueprint in May 2013 outlining the policy direction and objectives to ensure sustainable waste management in Hong Kong. South Korea had been doing very well in waste management and had established a strong track record in waste reduction and source separation. The country had also adopted some very advanced waste treatment technologies.

2. THE MISSION

2.1 The Global Green Hub Korea 2013

The Global Green Hub Korea 2013 was the 6th anniversary of Korea's largest conference focused on green industries. The conference was hosted by the Ministry of Trade, Industry & Energy and the Ministry of the Environment which gave a chance for one-on-one business matching focused on two main areas, the Environment and Energy.

2.2 Meeting with Ministry of the Environment

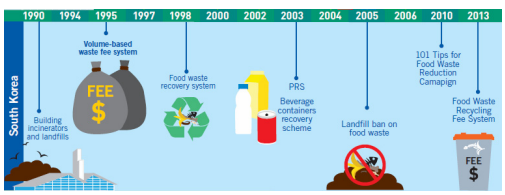
The meeting with the Ministry of the Environment allowed the members of the Hong Kong delegation to understand the waste management policies in South Korea. Focused areas included "Reduce", "Reuse", "Recycle", "Energy Recovery" and "Safe-treatment" .

WASTELINE : WINTER 2013 / 2014

The Newsletter of the Hong Kong Waste Management Association
Web Site: www.hongkongwma.org.hk

A volume-based waste fee system was implemented in 1995 and was followed by a food waste recovery system in 1998. In 2003 a recovery scheme was started for beverage containers. Under the scheme manufacturers may add bond money for the bottle to the price of the liquor or other beverage in the bottle and shall refund the money to any person who returns the empty bottle. As a result, over 95% of bottles were now being returned after use and over 85% of bottles were being reused.

Following a ban on direct landfilling introduced from 2005 most food waste was now recycled for feedstuff, or was composted or converted into biogas at public or private facilities. A volume-based food waste fee system was being widely implemented in more than 50% of the municipalities across the country. Three methods were used to charge for food waste collection: an RFID system, a payment slip sticker, and a food waste bag.



As a result the quantity of municipal waste discarded per capita reduced from 1.77 kg/day in 1981 to 0.95kg/day in 2011, a reduction of 47%. The delegation was also briefed on South Korea's extremely high waste recycling ratio of 83% which was among the highest in the world. It should be noted, though, that this 83% recycling rate included the recycling rate of construction waste. The adjusted recycling rate, omitting the amount of construction waste recycled, was 61%. This is the method of calculating waste recycling rates which is more commonly used in other jurisdictions. The amount of waste produced per person was reduced by 26% from 1.33kg per day in 1994 (the year before the system was brought into operation) to 0.99kg per day in 2006. Over the same period the amount of waste recycled also increased significantly from 8,927 tonnes /day to 27,900 tonnes/day – an increase of 213%.

2.3 Visit to Mapo Resource Recycling Facility

The facility has a total treatment capacity of up to 750 tonnes per day (three furnaces in total). Its total energy output is up to 520,000 G cal and electricity generation up to 35 million kWhr/ year, which is capable of supplying 11,700 households.

2.4 Visit to Metropolitan Recycling Centre

Metropolitan Recycling Center (MRC) is located at Yongin city of Gyeonggi province. MRC is one of the seven Waste Electrical and Electronic Equipment (WEEE) recycling centers in South Korea. MRC started operation in May 2003 and presently recycles about 21,000 tonnes of WEEE each year. The whole nation of 50 million people recycles about 120,000 tonnes of WEEE annually.

The WEEE recycling activities are driven by the "Resource Recycling of Electrical & Electronic Equipment and Vehicles" Act, namely, the "Korea RoHS". The Korea Association of Electronic Environment (KAEE) was set up in 2000 to manage all the relevant matters relating to the recycling of WEEE, including: education, communications, collection, facilitation between manufacturers and WEEE producers, new technology development and international exchange, investigation and research of recycling statistics, etc. Today, the private sector finances and operates all the WEEE recycling centers.

MRC occupies a site of 25,000 sq. m. with a processing plant covering 5,540 sq. m. of it. The majority of the WEEE consists of refrigerators, washing machines, TVs (flat panel and CRT type) and other miscellaneous items. Air conditioners contribute a much smaller percentage of WEEE than in Hong Kong due to the relatively short summer season in South Korea. The recycling process of WEEE includes manual dismantling, hazardous material (e.g. CFC) recovery, shredding, sorting, etc. The recyclables from the process are ferrous metals, non ferrous metals and plastics of various types (PE, PP, ABS, etc.) which are sold to material recyclers and subsequently manufacturers. The technology involved significantly affects the level of purity of different materials and thus the economic return for the centre.

The recycled quantity per person in 2011 was 2.5 kg, a significant improvement from the 0.9 kg when the system started in 2000. The amount of materials recovered, the energy saved and the jobs created are testament to the determining factors behind this success - clear legislation and committed enforcement from the government authorities, as well as nationwide education of everyone from toddlers to the silver haired to instill the correct mindset to avoid waste and encourage recycling.

The latest initiative to promote and sustain an effective recycling society is to encourage manufacturers to adopt the "Design for Recycling" concept – to avoid hazardous materials whenever possible and to design individual components for easier recycling.

2.5 Visit to Korea Association of Electronics Environment, Yongin Recyling Center

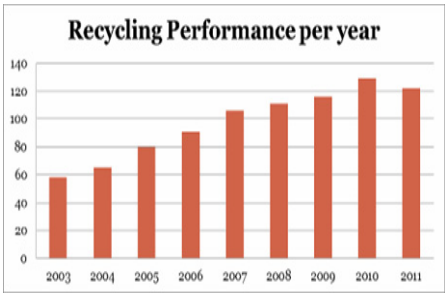
The Korea Association of Electronics Environment (KAEE) was established in September 2000 and embarked on the development of a resources recirculation society through collection and recycling of waste electronic and electric products. They have a few types of membership, including Regular Members, comprising 118 manufacturing and import companies including Samsung and LG Electronics and Associate Members comprising 59 recycling companies including Narae R/C. In June 2003, they constructed MRC (Metropolitan Recycling Center). From 2012 to date they have been working on the establishment and operation of a national recycling network.

WASTELINE : WINTER 2013 / 2014

The Newsletter of the Hong Kong Waste Management Association
Web Site: www.hongkongwma.org.hk

The "Resource Recycling of Electrical & Electronic Equipment and Vehicles" Act, i.e. Korea RoHS, was enacted on 1 February 2008 for electrical and electronic appliances including televisions, refrigerators, mobile telephone terminals, washing machines, personal computers & accessories, audio equipment, air-conditioners, printers, copiers and fax machines.

Additionally KAEE has developed a collection and recycling network which incorporates 100 logistics centers nationwide and 3,300 distributing agencies. Discarded E-wastes are collected by 232 local autonomous authorities and also through advanced recycling centers in seven regions nationwide and 59 co-operating recyclers.



**Over 120,000 tonnes of E-wastes have been collected and recycled in one year*

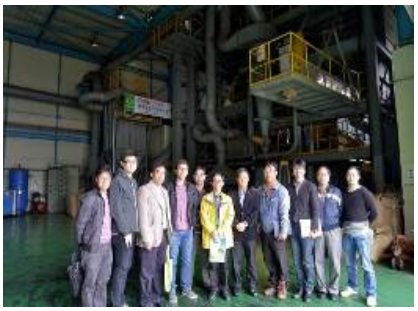
2.6 Visit to Incheon Environment Corporation

The Refuse Waste Incineration Plant's capacity is up to 500 tonnes per day and there are two furnaces. Total electricity generation is up to 16 million kW/ year. There is also another facility for treatment of food waste with a treatment capacity of up to 100tonnes per day.

The Food Waste Treatment Facility has a capacity of 100tonnes/day of domestic food waste with an output of 29.3tonnes of dried feed per day. The treatment process consists of a crusher & separator, dehydrator, disc dryer, magnetic separator & pelletizer. The disc dryer makes use of the thermal energy generated in the nearby incinerator to minimize the energy input to the facility and the feed is kept at a temperature of 170 ℃ for three hours to kill any bacteria. To ensure optimal nutrient values, the dried feed is supplemented with other ingredients such as soybean, wheat bran and rice bran. Pelletizing the feed from powder to particles prevents respiratory diseases in animals which can be caused by powder-type feed.

100 tonnes input of domestic foodwaste	80% wastewater
	12% compost + feed
	8% inert waste

Total treatment cost for each tonne of food waste: HKD1,400 (which is quite high).



2.7 Visit to Sudokwon Landfill

Claimed to be the world's largest landfill site, Sudokwon landfill is dedicated to the proper treatment of waste collected from the Seoul metropolitan area by converting waste into energy and actively creating a better living environment for the local residents. Sudokwon landfill operates the world's largest power plant utilizing landfill gas. It has a capacity of 50 MW and the plant generates electric power of 430GWh annually and reduces greenhouse gas emissions by 850,000 $CO_{2\text{-}e}$ tonnes. Sudokwon landfill has transformed a closed landfill site into an environmental theme park called DREAMPARK for residents of the metropolitan area. The park comprises a wild flower garden, a sports complex and also a golf course where the 2014 Incheon Asian Games' Golf will be held. A Metropolitan Eco & Energy Town is now being constructed in part of the landfill site. Due to be complete by 2017 it consists of four separate energy-based communities – the Waste-to-Energy Town (combustible waste to solid fuel (RDF) plant); the Natural Energy Town (solar power plant); the Bio Energy Town (biomass and biodiesel complex) and the Eco-culture Complex (environmental technology research centre). The Metropolitan Eco & Energy Town will produce 2.61 million Gcal of energy annually, which is sufficient to replace 1.92 million barrels of petroleum and reduce CO_2 emissions by 1.2 million tonnes.

Article contributed by Kenny Wong

WASTELINE : WINTER 2013 / 2014

The Newsletter of the Hong Kong Waste Management Association
Web Site: www.hongkongwma.org.hk

Inauguration ceremony of Hong Kong Green Strategy Alliance cum Seminar on Waste Management on 11 June 2013

The Hong Kong Green Strategy Alliance (HKGSA) is a non-profit making NGO founded in 2012. The Association held its formal Inauguration Ceremony on 11 June 2013. Its aim is to gather together a group of professionals and other stakeholders who are visionary and who are willing to undertake the responsibility of tackling the pressing issues of environmental protection and sustainable development. Through active participation, discussions and exchanges of views on green issues, projects and technologies, HKGSA aims to offer its group's professional opinions and solutions to tackle green issues in Hong Kong and the neighboring region.

On the same date as its Inauguration Ceremony, HKGSA organized a half-day seminar on Waste Management, drawing on the know-how from local experts. HKWMA was a supporting organization of the seminar. The purpose of this seminar was to provide a platform for policy makers, government officials, academics, consultants, engineering professionals and property management practitioners to exchange views on waste management policies, treatment technologies and management practices, taking into account the unique constraints and circumstances particular to Hong Kong. The seminar was well attended with more than 200 people participating.

Ir The Hon Dr LO Wai Kwok, BBS, MH, JP, Chairman of HKGSA, first delivered his welcome remarks to officially kick off the seminar. His remarks were followed by the keynote speech given by the Guest of Honour, Mr WONG Kam Sing, JP, Secretary for the Environment, The Government of the HKSAR.

Three papers were then delivered, as follows:

Challenges of Municipal Solid Waste Management in Hong Kong

***Ir Professor POON Chi Sun**, Professor and Associate Head (Research & Development)*
Dept of Civil and Environmental Engineering, The Hong Kong Polytechnic University

MSW Charging
Professor Nora TAM Fung Yee, BBS, JP
Member of the Council for Sustainable Development and Convener of Support Group on Public Engagement Exercise for Municipal Solid Waste Charging, and

Food Waste Management in Hong Kong: Challenges and Opportunities

Ir Elvis AU Wai Kwong, JP
Assistant Director (Nature Conservation & Infrastructure Planning)
Environmental Protection Department, HKSAR

The seminar concluded with a panel discussion moderated by Ir Dr Lo and attended by the three invited speakers, Mr Dominic YIN and Professor HO Kin Chung.

Members of HKGSA with the Guest of Honour, Mr Wong Kam Sing and Chairman, Ir. The Hon Dr. Lo Wai Kwok

Article contributed by Barry Lee

Technical visit to Dunwell Used Oil Recycling Facility

A technical visit to Dunwell Used Oil Recycling Facility at Yuen Long was successfully held on 29th June 2013. This technical visit provided opportunities for the visitors to learn about the fundamentals of used oil recycling and the contributions made by Dunwell Group to the promotion of waste recycling in Hong Kong. The visitors were privileged to have as their guide Mr. Victor C. Li, from Dunwell, who gave an insight into Dunwell's background and achievements.

Mr. Victor Li explaining part of the recycling process to his visitors

Throughout the technical visit, Victor not only shared with the visitors the fundamentals of the used oil recycling system "VMAT", he also shared his experience in the industry and the difficulties faced in setting up such a business in Hong Kong. The objective of the technical visit was to provide basic information regarding the concept of waste recovery and recycling to HKWMA members, with the aim of promoting green technology in Hong Kong.

The feedback was encouraging as the visitors were very active during the question and answer session at the end of the visit. They learnt the difficulties of harnessing used oil recycling in Hong Kong and understood more about the importance of this technology.

The visitors with Mr. Li holding his HKWMA Certificate of Appreciation at the end of the visit

HKWMA Young Members Chapter (YMC) thus would like to take this opportunity to thank Dunwell for their valuable assistance leading to the success of the technical visit.

Article contributed by Kenny Lok

A Technical Visit to the Zero Carbon Building

A technical visit to the Zero Carbon Building (ZCB) at Kowloon Bay was successfully held on 20th July 2013. About 20 members participated in the visit to this pioneering and inspiring project.

The guide from ZCB introduced to the HKWMA visitors that the ZCB, as the first zero carbon building in Hong Kong, had been developed by the Construction Industry Council and the Hong Kong Government with the aim of promoting the reduction of greenhouse gas (GHG) emissions, demonstrating the practicability of low carbon living and encouraging good environmental practices in the construction industry.

The indoor environment of the ZCB, which was spacious, bright and cool, surprised the visitors because energy-consuming home-type electrical equipment was employed to maintain the comfort, such as air-conditioners, lamps and fans. The guide explained that the zero carbon emission was achieved by adopting an integrated design, based on an energy hierarchy approach and eco-efficiency principles, without sacrificing the indoor comfort. The ZCB showcased the state-of-the art eco design of a building. For example, the air conditioning is actually an eco-cooling building system operated by chilled beams at the ceiling and underground cooling. In addition the fans are high-volume-low-speed fans with lower noise and an intelligent lighting management system operates the lamps.

The visitors were interested in these novel eco designs in the ZCB and actively asked questions during the questions and answers session. Through this visit they learnt the updated practice in sustainable construction and eco building.

The Visitors outside the ZCB

HKWMA Young Members Chapters (YMC) would thus like to take this opportunity to thank ZCB for their valuable assistance leading to the success of the technical visit.

Article contributed by Ray Zhou

WASTELINE : WINTER 2013 / 2014

The Newsletter of the Hong Kong Waste Management Association
Web Site: www.hongkongwma.org.hk

HKWMA YMC --Student Competition 2013, "From Waste to Wonder"

The YMC had been planning to organize the Student Competition 2013, "From Waste to Wonder" since September 2012. This was the second time YMC had held such a competition. The target group for the competition was tertiary students and the objective was to raise public awareness of environmental protection and to promote a sense of good waste management practice.

Each team vying for the prize was allowed up to a maximum of four members. They were required to submit their application with an abstract and then a video clip of not more than 5 minutes duration as the final product to show how waste can be managed, be transformed to usable items or be applied in daily life so as to achieve an environmentally friendly result. From preparation, promotion, decision making on format and satisfying the judging criteria and assessment, all the YMCs who entered the competition put in a great effort to make it successful.

The deadline of the competition was 31 July 2013. The submissions received were all well-organized with sensible ideas to address the topic. For example, one video described the application of transforming plastic bottles to shoes for a developing country (i.e. India); another video showed examples of turning rubbish to "wonder" in daily life and some other videos described sustainable ways of treating home-food waste.

The judging involved a panel of five Exco member volunteers and the YMCs. After all the marking, the first prize went to Mr. Kwok Ka Ming and his team with the topic "Plastic Bottle Footprint"; the first runner-up prize went to Mr. Leung Ho Yin and his team and the prize for second runner-up went to Mr. Chung Ho Yin.

The winners were invited to attend the 2013 AGM to receive their prizes. It was rewarding to be able to interact with the winners face-to-face and hear them share their special thoughts and insights that arose throughout their development of their ideas.

The first runners-up at the AGM

The winning student team with members of the YMC Committee at the AGM

Article contributed by Kitty Lee and Connie Chan

WASTELINE : WINTER 2013 / 2014

The Newsletter of the Hong Kong Waste Management Association
Web Site: www.hongkongwma.org.hk

International Conference and Exhibition on Solid Waste Management and Recycling

On 5th September 2013, the "International Conference on Solid Waste Management and Recycling" was organized by the International Solid Waste Association (ISWA) and China Association of Urban Environmental Sanitation (CAUES) at Wuhan International Expo Center. This was the first ISWA conference held in Wuhan, China. Over 500 overseas guests attended the conference.

As a key annual activity, 13 foreign dignitaries and national organizations participated in the discussion at this international conference. Nearly 1,500 delegates from 30 provinces and autonomous regions attended the meeting. Dozens of companies introduced stage-of-the-art technologies, solutions of municipal solid waste reduction, resource recovery, success stories of new products and demonstration projects.

During the Conference, an international forum on solid waste management and recycling was held. Insightful ideas were exchanged between different parties, including international organizations and experts, sanitation authorities, sanitation research centres, design institutes and other government departments. According to the "TwelfthFive Year Plan", the solid waste management industry is expected to develop rapidly in China. Within the next 5 years, investment in the solid waste management industry in China is expected to reach RMB 800 billion, which accounts for 25.8% of the total planned investment in the environmental protection industry.

In the opening ceremony, Mr. Hermann Koller from ISWA presented a keynote speech titled "Global Waste Management Perspectives" to report on the overall progress of solid waste management and treatment methods globally.

After Mr.Koller's speech, Dr. Janya Sang-Arun from the Institute for Global Environmental Strategies (IGES) presented a paper on an "Integrated Approach and Lifecycle Approach (LCA) with Case Study". Since the conventional approach of "Collection and Disposal" is no longer acceptable in terms of sustainability, an integrated approach that considers the lifecycle impacts of waste management was introduced. During session 2: "Implementation Measures for Sustainable Waste Management", Prof. Bernahard Raniger, Technical Director of the Sino - German Optimization of Biomass Utilization Project, also presented a paper on "Food Waste Management, Experience from Germany". Prof. Raniger highlighted the legislation problem in China and shared the best practice developed from the European experience.

Overall speaking, the conference was well organized in an excellent conference venue. The Conference ended with an in-depth discussion among the audience, speakers and panelists on all aspects of Solid Waste Management.

Article contributed by Jude Chow

Technical Visit to St. James WEEE Go Green Recycling Centre and the EcoPark Visitor Centre

On October 5, 2013 the HKWMA Young Members' Chapter (YMC) organized a technical visit to the St. James WEEE Go Green Recycling Centre and the Visitor Center at EcoPark near Tuen Mun. The visit was well supported with about 28 members attending.

Mr. Mak Fung Chi, who is in charge of the Recycling Centre, first introduced the general functioning of this non-profit organization at the Education Centre. He explained about the proper handling of waste electrical appliances like washing machines, refrigerators, air conditioners and televisions. The electrical appliances are sent for repair or, if they can no longer be used, they will be dismantled into parts. After repair and safety checking, the electrical appliances are delivered to needy people in Hong Kong. Mr Mak showed the visitors where electrical cables are shredded to become copper powder, the storage areas for fridges and washing machines, the refurbishment area and the dismantling area.

The YMC Visitors at the St. James' WEEE Recycling Centre

Later, at the EcoPark Visitor Center

Overall the two visits on the day were very informative. For the first part of the visit, attendees were all impressed by the waste electrical recycling facility which promotes green culture while at the same time helping those in need; while the second part of the visit reminded everyone of the importance of good waste management.

Article contributed by Kitty Lee

Conference on Novel Insights in Waste Management and Clean Air cum The 7th Two-Coast Forum on Sustainable Solid Waste Management

On 22 November 2013 HKWMA, HKIE (Environmental Division) & IMechE jointly organized a conference on "Novel Insights in Waste Management and Clean Air cum the 7th Two-coast Forum on Sustainable Solid Waste Management" in the conference hall of HKPC. The conference provided a platform for the participants to share and exchange the most recent views about the policies, practices and technologies on sustainable waste management and air pollution control. Nearly 300 delegates participated in the conference, including policy makers, government officials, academics, consultants, engineers and professionals from Mainland China, Hong Kong, Macau and Taiwan, together with overseas guest speakers from the UK and Sweden.

To kick off the conference, an opening address was delivered by Ir. Raymond Chan Kin-Sek (President of HKIE). Then, three keynote speeches were presented by Mr. Wong Kam-Sing (Secretary for the Environment, Hong Kong Government), Dr. Colin Brown (Engineering Director of IMechE(UK)), and Ir. Dr. Hon Lo Wai-Kwok (Legislative Councilor - Engineering of the HKSAR). Mr. Wong emphasized the current challenge on landfill extension and food waste treatment and explained the progress of introducing Producer Responsibility Schemes (PRSs) in Hong Kong. Dr. Brown provided a summary of recent and future trends in waste management and its industry in the UK. The speech presented by Ir. Dr. Lo pointed out that the HKSAR government should further strengthen its partnership with Mainland China in the reduction of air pollution.

Figure 1

Conference organizers and the conference keynote speech

One of the two breakout sessions after the keynote speeches was the 7th Two-Coast Forum on Sustainable Solid Waste Management, co-organized by the Chinese Association of Urban & Environmental Sanitation (CAUES), the Chinese Institute of Environmental Engineering (CIEnvE) in Taiwan, and the Macau Institution of Engineers as well as HKWMA. The Forum was chaired by Ir. Barry Lee (Chairman of HKWMA) who gave a welcome address to greet the delegates and audience. Mr. Xu Wen-Long (Vice President of CAUES), Dr. Eugene Chien (Chairman of Taiwan Institute of Sustainable Energy) and Mr. Eddie Wu (President of the Macau Institution of Engineers) also delivered short reports to update and exchange information on waste management and technology progress in their regions. A talk titled "Waste Management in Stockholm and Sweden" was later presented by Mr. Nils Lundkvist from the Waste Management Administration of the City of Stockholm to demonstrate the experience gained in and the future planning for managing the municipal solid waste generated in Stockholm. Prof. Hsiao-Kan Ma of National Taiwan University reported on the initiatives introduced to reduce and recycle waste in Taiwan and to share his views on effective strategies for developing a sustainable waste management system. After the presentations, a Q&A session was arranged to highlight the key issues in the presentations and also to allow the audience to interact with the speakers on specific questions.

Figure 2

Interactive Q&A session at the end of presentations with panel members (from left) Prof. Hsiao-Kan Ma, Ir. Barry Lee and Mr. Nils Lundkvist.

The second part of this breakout session invited Mrs. Mimi Cunningham (Director of HR & Sustainability of The Hong Kong Jockey Club) to present a talk titled "Waste Management in HKJC: Commitment, Practices and Engagement" in which she introduced the HKJC's waste management experience and its outcomes. Mr. Joe Chen from Laogang GTE (Shanghai) reported on an on-going landfill gas-to-energy project in Laogang MSW landfill including the project details of the construction works, the electricity generation system and the economic factors. Prof. Chang Moo-Been of National Central University later presented a talk titled "Reduction and Monitoring of Dioxin Emission during Waste Incineration Process" to point out a method of effectively reducing the emissions of dioxins from an incinerator by activated carbon injection combined with bag filter and selective catalytic reduction (SCR) techniques.

In the final part of the session, three experts delivered their studies on:

* the grade evaluation of MSW Waste to Energy (WTE) projects in China by Mr. Xu Hai-Yun of the Urban Construction Research & Design Institute,
* the recycling situation in Macau by Mr. Eddie Wu of The Macau Institution of Engineers,and
* the status and perspective of MSWI bottom ashes recycling in Taiwan by Prof. Ko Ming-Sheng, of the National Taipei University of Technology.

At the closing ceremony of the session, it was announced that the 8th Two-Coast Forum on Sustainable Solid Waste Management would be held in Taiwan and hosted by the Chinese Institute of Environmental Engineering (CIEnvE).

On the second day of the forum, HKWMA arranged technical visits to a Plastic Resources Recycling Centre in Eco-park and WENT Landfill led by Dr. Kaimin Shih (HKWMA Ex-co member; The University of Hong Kong). The visits provided a more complete picture about the operations and the current status of Hong Kong's waste treatment facilities and provided an opportunity to exchange experiences with the overseas forum delegates.

Figure 3

Technical visits to Plastic Resources Recycling Centre in Eco-park and WENT Landfill led by Dr. Kaimin Shih

Overall, this forum had a very satisfactory outcome and was a main event for HKWMA in 2013. It served as a very effective platform for delegates to have a greater insight into the newest waste management policies, practices and technological advances in Mainland China, Hong Kong, Macau and Taiwan. Building on the very successful organization in 2013, this unique platform will further serve the industry and research communities in the upcoming year in Taiwan.

Article contributed by Mr. Minhua Su

WASTELINE : WINTER 2013 / 2014

The Newsletter of the Hong Kong Waste Management Association
Web Site: www.hongkongwma.org.hk

YMC Christmas Gathering 2013

The HKWMA YMC members had a Christmas gathering at Jolly Thinkers, a cafe for board and card gaming, on 21 December 2013. The theme of the gathering was organized around 'fun & green'.

Fun:
At Jolly Thinkers, the YMC members, along with their friends, had a great time playing various kinds of board and card games, while enjoying the interactions and teamwork. Among over 100 kinds of board / card games offered for playing, some were rather tricky and challenging both intellectually and physically (one has to 'think' and 'act' at the same time!).

Green:
'Green' has always been the focus for events organized by HKWMA and this social gathering was no exception. Every now and then, every one of us has received a gift that we do not really need but would not mind 'recycling' by giving it to someone else. For this gathering, instead of buying new gifts from shops, the YMC members brought and exchanged their 'recycled' gifts. Of course, to reduce waste no gift repackaging was allowed.

Ray and Kenny exchanged 'recycled' gifts.

Group photo of HKWMA YMC Christmas gathering participants.

Article contributed by Amy Zhang

"HKWMA Gives Its Support"

Over the last few months HKWMA has been pleased to give its support to the following organizations and events which are not reported elsewhere in this edition of Wasteline :

1. **Waste Management Symposium 2013**
   2 July 2013 in Singapore
2. **JCI Peninsula "Go Green Chopsticks" Green Choice summit**
   27 July 2013
3. **Institution of Mechanical Engineers (Hong Kong Branch), Young Leadership Conference**
   16 – 17 September 2013
4. **Seminar on Clinical Waste Management jointly organized by HKPC and HKIE Bio-Medical Division**
   27 September 2013
5. **The "8th Eco-Expo Asia" organized by HKTDC**
   28 – 31 October 2013
6. **Statement released to the press by the Alliance for Promoting Sustainable Waste Management for Hong Kong**
   21 November 2013
7. **Waste Management Seminar series jointly organized by HKWMA with the HKIE (Young Members' Committee and Environmental Division) and I Mech. E (Hong Kong Branch)**
   - ~ ***Waste Charging***
     15 January 2014
   - ~ ***Waste-to-energy for MSW Treatment***
     24 March 2014
8. **Hong Kong Mission to "GLOBE 2014" conference and trade show in Vancouver**
   23 – 29 March 2014, and
9. **Hong Kong Green Strategy Alliance Spring Reception**
   8th April 2014

Reported by Barry Adcock

WASTELINE : WINTER 2013 / 2014

The Newsletter of the Hong Kong Waste Management Association
Web Site: www.hongkongwma.org.hk

Waste Management Seminar Series :

HONG KONG'S COMPREHENSIVE WASTE MANAGEMENT STRATEGY FOR THE COMING 10 YEARS

This evening seminar was jointly organised by HKWMA in co-operation with the HKIE, Environmental Division and Young Members' Committee and the Hong Kong Branch of the IMech.E.

On 21 February 2014 Ir Dr Alain Kwok-Lun Lam, Principal Environmental Protection Officer of the Environmental Protection Department (EPD) of the Hong Kong SAR Government outlined Hong Kong's present and future waste problems, the blueprint for sustainable use of resources and the associated action plans for the coming 10 years.

The 14,000 tonnes of waste presently generated every day are classified as (i) municipal solid waste (MSW) encompassing domestic, commercial and industrial refuse (67 %), (ii) construction waste (25 %), (iii) sludge generated in waste water treatment processes and (iv) others such as animal and clinical wastes [8 % for (iii) and (iv) combined]. The current large waste load, compounded by the incomplete infrastructure, has led Hong Kong to its refuse crisis. In terms of kilograms of the rate of domestic waste generation per capita, Tokyo (0.77) is at the top of the best performance rank in the major Asian cities, followed by Seoul (0.95), Taipei (1.00) and Hong Kong (1.36). Hong Kong is the only major Asian city which has no incineration facilities for treating MSW.

In 2012, the ratio of landfilling versus recycling was 61 % to 39 %, as compared with recycling of 48% in 2011. The decreasing trend in recycling is due to all collected recyclable materials being exported, principally plastics to Mainland China, while the export demand has dropped following the "green fence" policy imposed by the Mainland government. Concurrently, the landfill sites in Hong Kong are approaching exhaustion. The first exhausted landfill is South East New Territories Landfill (in 2015) and then North East New Territories Landfill (in 2016), while the remaining West New Territories Landfill is expected to be full in 2019. The situation of sole reliance on landfill is unsustainable.

In 2013, the government issued its "Blueprint for Sustainable Use of Resources" (Blueprint) which outlines the waste management hierarchy, namely (i) prevention (reduce quantity and type), (ii) reuse (repair and reuse old items), (iii) recycling (reprocessing of waste), (iv) recovery (waste-to-energy) and (v) disposal. The target is to reduce the daily MSW disposal rate from 1.27 kg/capita (in 2011) to 1.00 kg/capita (in 2017) and finally 0.80 kg/capita (in 2022). Though the reduction of 0.47 kg per capita in ten (10) years may appear relatively trivial, after multiplying this figure by the population in the territory of over seven (7) million, the amount of waste reduction is substantial.

The Blueprint paints the action plans in the coming ten (10) years as follows.

Prevention – MSW Charging

The principle of MSW charging is to use levying as an economic incentive that changes behaviour and leads people to cut down waste generation.

Over the recent three (3) month public consultation, 60 % of the written responses supported the "polluter pays" principle and, out of the various charging regimes proposed, including fixed or standard rate, tie-in with water consumption and quantity-based or "pay-as-you-throw", the quantity-based charging scheme was preferred. The questions of the charging mechanism, coverage of charging scheme, charging level and recycling were explored via a public engagement exercise conducted by the Council for Sustainable Development:-

- Charging mechanism: Various means of charging for domestic waste disposal were discussed, (i) by household by volume (using designated bags for waste collection), (ii) by building by weight [the identification of who has dumped what is ascertained by manual recording or reading of bar-codes or radio frequency identification (RFID) attached to refuse bins, and how much has been dumped by the use of refuse truck-mounted scales together with RFID] and (iii) by building by volume [by counting the number of 660 litre refuse bins collected].

- Charge coverage: currently commercial and industrial refuse is collected by private waste collectors who only charge the waste producers the collection cost. No disposal cost is incurred because the use of the landfill is free of charge at present. In future, however, the disposal of such waste in landfills will be subject to a levy and the waste producer will have to bear the cost of both collection and disposal.

- Charging level: currently a charge is levied only for the disposal of construction waste; but following the introduction of the proposed MSW charging scheme, the construction waste charging level will be subject to revision.

- Recycling: the provision of sufficient recyclable waste disposal outlets is a prerequisite for the introduction of a charging scheme in any form.

Prevention – Producer Responsibility Schemes

For the minimisation of waste generation and the promotion of reuse and recycling, more Producer Responsibility Schemes (PRS) are to be introduced to engage stakeholders along the whole supply chain (encompassing manufacturers, importers, distributors, retailers and consumers) to share eco-responsibility for the proper treatment, recycling and disposal of end-of-life products. PRS follows the cycle of source separation, efficient collection, proper treatment and reuse or recycling outlets, which is funded by charging a levy on new products.

The first PRS was the plastic shopping bag levy, which has transformed the consumer habit of using plastic bags. While currently 47 retailers with about 3,500 retail outlets have been covered, it is contemplated to extend the scheme to the entire retail sector in April 2015.

The second PRS is to be on waste electrical and electronic equipment (WEEE), covering television sets, fridges, washing machines, air-conditioners and computer products. In future, sellers will have to provide a take-back service for WEEE, while the WEEE collected will be processed in a new WEEE Treatment Facility in the EcoPark, Tuen Mun. With a design process capacity of 30,000 tonnes per annum, contract award and commissioning of the Facility are expected to be in mid-2014 and the end of 2016 respectively. The Facility operator will be required to provide sound traceability of the destination and use of the outgoing recycled materials.

The third PRS is to be for glass beverage bottles, which gained 70 % support in the public consultation conducted in 2013. The same as for the proposed MSW charging scheme, an expansion of the glass bottle collection network is required to ensure the success of the PRS.

Recycling and Recovery – Community Green Stations

One Community Green Station will be established in each of Hong Kong's 18 districts. Each Station will become the focal point of low-value recyclable material collection as well as educating the public and nurturing a green culture in the young generation, who in turn will educate their parents. The recyclable materials collected will be sent to EcoPark for reprocessing by government-funded non-government organisations (NGOs).

Recycling and Recovery – From Waste-to-Energy

The Sludge Treatment Facility is a waste-to-energy plant which is capable of transforming 2,000 tonnes of sludge per day into heat and electricity using fluidised bed incinerator technology. The project's capital cost of HK$5 billion will provide 2 MW of electricity output to the grid.

The Organic Waste Treatment Facility (OWTF) is designed to decompose 500 tonnes per day of organic wastes, principally food waste (pre-sorted ingredients preferred), into composted products and synthesis gas suitable for power generation. Two (2) sites of three (3) hectares each have been identified and the targeted dates for the commissioning of the first and second OWTFs are in 2016 and 2018 respectively.

The Integrated Waste Management Facility (IWMF) comprises a state-of-the-art incinerator with 3,000 tonnes per day capacity. Funding approval will be sought in the second quarter of 2014, while construction is planned to commence in 2016 to give a projected commissioning date of 2021/2022 .

From this projected timetable it may be seen that there will be a three (3) year gap between the exhaustion of all the landfills and the full operation of the IWMF, which poses a challenge to the waste management at that time.

In conclusion, waste recycling on its own is insufficient to tackle the refuse crisis ahead. Hong Kong definitely needs modern facilities together with landfill extensions to lead to resources recovery, a paradigm shift from the current concept of waste management. The legislature has shared the administration's concern that time is running out and decisions must be taken without further delay. From the administration's point of view, the bundled IWMF and extension of three (3) landfills altogether ("3 plus 1") is an integral package of waste management and recovery and hence should not be separated.

WASTELINE : WINTER 2013 / 2014

The Newsletter of the Hong Kong Waste Management Association
Web Site: www.hongkongwma.org.hk

The organisers thank Ir Dr Lam for the delivery of his insightful, informative and thought-provoking evening seminar.

Chairman of HKIE EVD, Ir T Y Yip (right), Chairman of HKWMA, Ir Barry Lee (left) and committee member of HKIE EVD, Ir Andrew Yuen (2nd from the left) jointly presented a souvenir to the guest speaker, Ir Dr Alain Lam, PEPO of EPD (2nd from the right)

Article contributed by W.H.Tsang

Waste Management Seminar Series :

ANAEROBIC DIGESTION OF FOOD WASTE FOR ENERGY RECOVERY AND WASTE REDUCTION

HKWMA have been pleased to join with other learned societies recently to organise seminars and other events of interest to the Association's members. On the evening of 3 March 2014 the Association joined up with the Hong Kong Institution of Engineers (HKIE) Environmental Division and Young Members' Committee and the Hong Kong Branch of the Institution of Mechanical Engineers (I MechE) to put on a seminar on a matter of particular current relevance in view of Government plans for the beneficial treatment of food waste.

The evening lecture was delivered at the HKIE Headquarters by Dr. Po-Heng Henry Lee, Assistant Professor in the Department of Civil and Environmental Engineering at The Hong Kong Polytechnic University (HKPolyU). His presentation introduced the technology of anaerobic digestion for converting food waste into energy.

Food waste in Hong Kong accounts for one-third, or 33 %, of the municipal solid waste, which is a shockingly high figure in comparison to the U.S., where it is 18 %. The amount of food waste generated by commercial and industrial activities has doubled in recent years, while the landfills in Hong Kong are close to exhaustion and the territory has not enough land for landfill extensions. To manage food waste in a sustainable way, the prime targets would be volume reduction, energy production and retrieval of nutrients. Anaerobic digestion provides a promising way of doing that.

In general, about 87 % and 95 % of the food waste in Hong Kong is respectively moisture and volatile solids . A similar composition is found across other countries, researchers have discovered, while the ingredients have an effect on the digestion rate. Anaerobic digestion comprises two principal processes, namely hydrolysis, which converts 75% of food waste into acetate and hydrogen gas (H_2) and acidogenesis which converts another 24% into carbon dioxide gas (CO_2) . The acetate is further converted into methane gas (CH_4) (72%) and CO_2 (28%).

While reaction kinetics, organic density and pre-treatment processes affect the amount of end products generated, the principles of thermodynamics help identify the determining processes in the food waste conversion. Overall, for harvesting the highest yield, (i) excessive air or oxygen exposure should be avoided, (ii) inhibitors such as ammonia and hydrogen sulphide should be removed from the feedstock early, (iii) the process should proceed to neutral pH but have sufficient alkalinity to drive the reactions, (iv) the feedstock should contain a low concentration of volatile fatty acids, (v) the temperature should be maintained constant at 30 to 38 ˚C for the mesophilic range and 50 to 60 ˚C for the thermophilic range and (vi) the process should have enough nutrients and trace metals like iron, cobalt and nickel.

Anaerobic digestion of food waste usually suffers from the accumulation of highly volatile fatty acids. This reduces the system stability resulting in various issues, e.g. foaming . An alternative design for anaerobic food-waste digestion could first start with physical pre-treatment and then undergo thermophilic digestion for conversion, followed by mesophilic digestion for polishing.

WASTELINE : WINTER 2013 / 2014

The Newsletter of the Hong Kong Waste Management Association
Web Site: www.hongkongwma.org.hk

In the U.S., anaerobic co-digestion of sewage sludge and food waste in wastewater treatment facilities is one of the practices used for food waste reduction and energy recovery. The output of biogas is burnt for power generation, while the solid is thickened and becomes compost for fertiliser. Cases in South Korea, Sweden, Thailand and Taiwan were presented in all of which the overall processes of thermophilic and mesophilic digestion were similar.

In Hong Kong, HKPolyU is also conducting studies on efficient anaerobic digestion of food waste both for methane generation and/or the production of a valuable chemical, n-caproate acid, with the objectives of achieving (i) waste reduction, (ii) energy recovery and (iii) fertilizer production.

Ir Barry Lee, Chairman of Hong Kong Waste Management Association presented the souvenir to the guest speaker Dr Henry Lee, Assistant Professor of Department of Civil and Environmental Engineering of Hong Kong Polytechnic University

The seminar attractred full house attendance

Article contributed by Wing Hay

Upcoming Events

1 *Chinese University of Hong Kong Jockey Club Initiative Gaia, public forum on "Municipal Solid Waste Charging"*
25 April 2014

2 *HKWMA YMC Visit to "Natural Network Farm" in Sheung Shui*
26 April 2014

3 *Waste Management Seminar Series "Solid Waste Engineering – Where we are and what are we looking for?"*
HKIE HQ
14 May 2014

4 *The Institution of Engineering and Technology (IET) Symposium on "Waste Minimization and Resources Conservation"*
23 May 2014

5 *"Clean Enviro Summit" and "WasteMET Asia 2014" in Singapore*
1 to 4 June 2014

6 *ISWA World Congress, Sao Paulo, Brazil*
8 – 11 September 2014

7 *HKWMA Annual General Meeting, Hong Kong Club*
23 September 2014

Compiled by Barry Adcock