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## INFORMATION NOTE

### Integrated waste management facilities in Hong Kong

#### 1. Introduction

1.1 During the past 30 years, the amount of municipal solid waste ("MSW")<sup>1</sup> in Hong Kong increased by nearly 80% while the population only grew by 36% and the Gross Domestic Product increased twofold. More importantly, the daily per capita MSW rate rose by 31% from 0.97 kg to 1.27 kg, which was higher than the corresponding figure in many other Asian cities of comparable economic development level. That means, not only are more Hong Kong people throwing away waste, but they are each throwing away 31% more.

1.2 However, Hong Kong relies principally on landfills for waste treatment. At present, about 13 500 tonnes of waste are disposed of at landfills every day, of which MSW accounts for 9 000 tonnes or two-thirds of the total.<sup>2</sup> In view of the fact that the three existing landfills<sup>3</sup> would exhaust their design capacity one by one during the mid- and end-2010s and the current reliance on landfilling for waste treatment is not sustainable, the Government has proposed the development of the Integrated Waste Management Facilities ("IWWMF") as an alternative approach to manage the waste generated in a cost-effective and sustainable manner. IWWMF adopts advanced incineration as the core treatment technology as well as recycling facilities for the recovery of recyclables from mixed MSW.

1.3 This information note provides an overview of the development of IWWMF in Hong Kong, with special reference to the waste management strategies initiated by the Government in recent years, design of the proposed IWWMF, and the recent development relating to the IWWMF project.

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<sup>1</sup> MSW is solid waste from household, commercial and industrial sources.

<sup>2</sup> The remaining one-third of MSW disposed at landfills comprises (a) 3 350 tonnes of construction waste, (b) 950 tonnes of sewage sludge, and (c) 200 tonnes of other waste.

<sup>3</sup> The three landfills are the South East New Territories Landfill, the North East New Territories Landfill and the West New Territories Landfill.

## **2. Integrated waste management facilities**

2.1 In 2005, the Government published the *Policy Framework for the Management of Municipal Solid Waste (2005-2014)* ("Policy Framework"). The Policy Framework sets out a framework for requisite action of managing MSW in terms of waste avoidance and minimization, and reuse, recovery and recycling of suitable recyclable materials. It also proposes the adoption of advanced technologies to treat unavoidable waste in a sustainable manner.

2.2 In January 2011, the Government announced an implementation plan for waste management strategies after the review of the Policy Framework. The implementation plan sets out three core strategies, which include the introduction of IWMF for waste treatment to help reduce the volume of waste as well as recovering energy for electricity generation during the incineration process.

2.3 To identify a suitable location for IWMF, a detailed site selection study was conducted during 2007-2008 to examine the potential sites for developing the facility against a range of criteria including environmental, ecological, planning, transport, technology/engineering, economic and social considerations. After further consideration, the Government launched a detailed Engineering Investigation and Environmental Impact Assessment Studies ("EI and EIA Studies") for two potential sites for IWMF: an artificial island near Shek Kwu Chau ("SKC") and a site at Tsang Tsui Ash Lagoons in Tuen Mun.

2.4 In February 2011, the Government announced the results of the EIA Study in which it identified the artificial island near SKC as the preferred site for developing the first IWMF in Hong Kong. The resultant EIA report on the development of IWMF Phase 1 was approved by the Director of Environmental Protection on 17 January 2012. Subsequently, the Director of Environmental Protection granted the environmental permit on 19 January 2012.

2.5 The EIA report reveals that the waters to the south of Lantau Island and Lamma Island, including the area around SKC, is an important habitat for Finless Porpoises. The construction of the proposed artificial island may result in a permanent loss of 31 hectares ("ha") of the habitat for Finless Porpoises. To compensate for the loss of the habitat, the EIA report proposes that a marine park of approximately 700 ha should be designated in a suitable area in the waters between SKC and the Soko Islands.

2.6 The EIA report also proposes a number of measures to mitigate the potential indirect impacts on Finless Porpoises during construction and operation of IWMF. These measures include avoidance of noisy works during peak Finless Porpoise season, monitoring of exclusion zone, adoption of regular traffic route, and limitation of vessel speed to 10 knots in areas with high Finless Porpoise sighting density.

2.7 As to the reclamation project required to create the artificial island near SKC, the EIA report proposes to use cellular cofferdam<sup>4</sup> rather than sloping seawall for reclamation so as to minimize dredging and filling works and its environmental impacts. By doing so, there will be no need to carry out large-scale sediment dredging works during breakwater construction on the artificial island. In addition, a number of mitigation measures, including silt curtain system, and control over dredging and filling rates, will be taken during construction to reduce impact of the works on marine resources.

#### Design of the proposed integrated waste management facilities

2.8 The Government plans to introduce IWMF in phases, with the first phase handling 3 000 tonnes of MSW per day. According to the Government, moving grate incineration technology will be adopted at the incineration plant based on the merits of its environmental performance, technological soundness, reliability, operation adaptability in waste treatment and cost-effectiveness. IWMF will be built on a piece of reclaimed land measuring about 11.8 ha with a berth area and a storage area for waste containers. It will comprise the following facilities:

- (a) an incineration plant including a waste heat recovery and power generation system, a flue gas treatment system, a stack, an ash storage and handling system, and an odour control system;
- (b) mechanical treatment and recycling facilities including mechanical shredding and sorting systems, and an odour control system; and
- (c) ancillary and supporting facilities including an administration building, an environmental education centre, a desalination plant, a wastewater treatment plant, an electricity supply and export system.

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<sup>4</sup> Cellular cofferdam is a way of reclamation whereby cellular metal cofferdams are used to enclose an area to be reclaimed before fill materials are poured onto the enclosed waters.

2.9 Electricity generated during the incineration process will be used for daily operation of the facilities within IWMF. Surplus electricity energy, estimated to be sufficient for 100 000 households annually, will be exported via the submarine cables to the existing power grid. Moreover, electricity generated from the incineration process will be a form of renewable energy. As such, the reduction of using fossil fuel for electricity generation by means of waste incineration, coupled with less MSW being landfilled, would reduce the total emission of greenhouse gas in Hong Kong by about 440 000 tonnes of carbon dioxide each year.

#### *Air quality management*

2.10 According to the Government, emissions from IWMF will comply with the European Union standards which are currently the most stringent international standards. The technology employed in the incineration process comprises the following elements:

- (a) temperature at 850°C – a strict process control of incineration at a temperature of at least 850°C to completely decompose organic matters and dioxins;
- (b) high turbulence – incineration under highly turbulent conditions to achieve complete combustion; and
- (c) residence time of at least two seconds – maintaining flue gas at a temperature of 850°C or above for a residence time of at least two seconds to achieve complete combustion and further reduce pollution.

2.11 IWMF will operate 24 hours daily throughout the year, but MSW will be received only from 8 a.m. to 8 p.m. MSW in sealed containers will be delivered daily by marine vessels from the existing refuse transfer stations<sup>5</sup> to the berth on the artificial island by sea.

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<sup>5</sup> Waste collection in the urban centre of population is delivered to the refuse transfer stations where waste is compacted and containerized in purposely built containers for onward transportation to landfills or IWMF.

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2.12 Moreover, an air cleansing system will be installed to ensure that emission from IWWMF will comply with the European Union standards. The system will include selective catalytic reduction for nitrogen oxides removal, activated carbon for dioxins removal and continuous emission monitoring system. On completion of IWWMF, an open and transparent monitoring system will be set up to provide the public with 24-hour access to real-time data from the continuous emission monitoring system so as to be assured that IWWMF will operate within the emission standards.

### *Treatment of pollutants*

2.13 As regards the pollutants emitting from IWWMF, flue gas generated from the incineration furnaces will be treated before discharge to the atmosphere. Meanwhile, fly ash and air pollution control residues produced from the incineration process will be pretreated and then disposed of at the West New Territories Landfill or its extension after checking for compliance with the proposed incineration residue pollution control limits.

## **3. Recent development of the integrated waste management facilities project**

### Funding proposal submitted to the Legislative Council

3.1 The Government presented the funding proposal of IWWMF Phase 1 to the Panel on Environmental Affairs of the Legislative Council ("Panel") on 20 April 2012. The estimated capital cost of the proposed works was HK\$14,960.1 million, with an estimated annual recurrent cost of about HK\$353 million.

3.2 Members were concerned about the close proximity of the project site to Cheung Chau<sup>6</sup> and the strong opposition from Cheung Chau residents and environmental groups. They urged the Government to offer a holistic package of waste management proposals with emphasis on waste reduction and recycling as well as means to address district concerns and local needs for betterment. In view of the various issues which were yet to be resolved, the Panel did not support the submission of the funding proposal to the Public Works Subcommittee.

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<sup>6</sup> The proposed IWWMF is to be constructed on an artificial island near SKC, which is located south of Lantau Island and between Cheung Chau and the Soko Islands.

### Judicial review launched by Cheung Chau resident

3.3 In light of the possible adverse effect on human health and the environment from incineration emissions, a leave application was made by a Cheung Chau resident in April 2012 to the Court of First Instance for a judicial review of the decisions of the Director of Environmental Protection and the Town Planning Board relating to the development of the IWMF Phase 1 project. Leave was subsequently granted on 7 June 2012 to proceed with the judicial review.

3.4 The applicant claimed that the Director's decisions to approve the EIA report and grant the environmental permit were unlawful as the report was not made in compliance with various provisions set out in the technical memorandum and the relevant study brief. Furthermore, as the project proponent under the EIA report was the Director herself, there was a breach of natural justice where the Director had acted both as the applicant for and the grantor of the approval of the EIA report and the environmental permit.

3.5 The applicant also challenged the decision of the Town Planning Board to submit the draft SKC Outline Zoning Plan to the Chief Executive in Council as such decision was made premised on the mistaken fact that the Director had lawfully approved the EIA report and granted the environmental permit.

3.6 According to the judgment of the Court of First Instance, the EIA report had complied with the relevant requirements in the technical memorandum and the study brief, such as the ecological impact assessment and health risk assessment. As regards the possible breach of natural justice, the court was of the view that the Director of Environmental Protection herself had played no actual or active role in either the planning of IWMF (including the preparation of the EIA report) or the approval of the EIA report and the decision to issue the environment permit.<sup>7</sup> The Director's name was used only nominally as the project proponent and the court "*would not conclude that there was a reasonable apprehension of bias on the part of the decision maker.*" Furthermore, in view that the applicant's challenge to the Director's decisions was unsuccessful, the court ruled that the alleged "*material error of facts*" was not operative to quash the decision made by the Town Planning Board.

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<sup>7</sup> According to the court, it has taken into account the factual and complete segregation in personnel and duties within the Environmental Protection Department in the infrastructure planning aspect including the preparation of the EIA report, and in the EIA process relating to the project.

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3.7 Against the above, the Court of First Instance dismissed the judicial review on 26 July 2013 citing all the grounds raised by the applicant had failed, and ruled in favour of the Government.<sup>8</sup> It was reported that an appeal had been subsequently lodged against the rejection of the judicial review at end-2013.<sup>9</sup>

### Hong Kong Blueprint for Sustainable Use of Resources 2013-2022

3.8 Faced with the inadequacies of waste infrastructure in Hong Kong and the exhaustion of the three landfills by end-2010s, the Government published the *Hong Kong Blueprint for Sustainable Use of Resources 2013-2022* ("Blueprint") in May 2013. The Blueprint analyses the challenge and opportunities of waste management in Hong Kong, and maps out a comprehensive strategy, targets, policies and action plans for waste management for the coming 10 years with a view to tackling the waste crisis in the territory.

3.9 Specifically, the Blueprint sets out an overall target of reducing the MSW disposal rate on a per capita basis from 1.27 kg to 0.8 kg or below by 2022, representing a 40% decrease from 2011. It also aims to transform Hong Kong's waste management structure such that waste recycling, modern incineration and landfill disposal will account for 55%, 23% and 22% respectively by 2022.<sup>10</sup> This allocation would be closer to the widely adopted waste management structure in the advanced economies. According to the Government, the committed investment in waste infrastructure such as IWMF, sludge treatment facility<sup>11</sup> and organic waste treatment facility<sup>12</sup> should lend support to achieve the target waste management structure by 2022.

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<sup>8</sup> See the Judiciary of the Hong Kong Special Administrative Region (2013).

<sup>9</sup> See South China Morning Post (2013).

<sup>10</sup> Currently, Hong Kong's recycling rate is about 48% and landfilling rate is 52%.

<sup>11</sup> The sludge treatment facility deals with sewage sludge and turns waste to energy. The facility is under construction and expected to achieve full operation in 2014.

<sup>12</sup> The organic waste treatment facility will be constructed in two phases to recycle and turn food waste into renewable energy and compost. Both phases are expected to commission between 2016 and 2018.

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## References

1. Council for Sustainable Development. (2013) *Waste Reduction by Waste Charging • How to Implement? Invitation for Response Document*. Available from: [http://www.susdev.org.hk/share/pdf/MSW\\_IR\\_ENG.pdf](http://www.susdev.org.hk/share/pdf/MSW_IR_ENG.pdf) [Accessed February 2014].
2. District Council. (2013) *Discussion Papers of Islands District Council: Comprehensive Waste Management Blueprint 2013-2022*. Document No. IDC 118/2013. Available from: [http://www.districtcouncils.gov.hk/island/doc/common/dc\\_meetings\\_doc1/2013/IS\\_2013\\_118\\_EN.pdf](http://www.districtcouncils.gov.hk/island/doc/common/dc_meetings_doc1/2013/IS_2013_118_EN.pdf) [Accessed February 2014].
3. Environment Bureau. (2012a) *Administration's paper on "Reduce, Recycle and Proper Waste Management"*. Paper submitted to the Panel on Environmental Affairs of the Legislative Council for discussion on 26 March 2012. LC Paper No. CB(1)1369/11-12(01).
4. Environment Bureau. (2012b) *Administration's Paper on Reduce, Recycle and Proper Waste Management*. Paper submitted to the Panel on Environmental Affairs of the Legislative Council for discussion on 20 April 2012. LC Paper No. CB(1)1628/11-12(01).
5. Environment Bureau. (2013) *Hong Kong Blueprint for Sustainable Use of Resources 2013-2022*. Available from: <http://www.enb.gov.hk/en/files/WastePlan-E.pdf> [Accessed February 2014].
6. Environmental Protection Department. (2011a) *Agreement No. CE 29/2008(EP): Engineering Investigation and Environmental Studies for Integrated Waste Management Facilities Phase 1 – Feasibility Study*. Available from: [http://www.epd.gov.hk/eia/register/report/eiareport/eia\\_2012011/ES/ES\\_PDF/IWMF\\_ES\\_English.pdf](http://www.epd.gov.hk/eia/register/report/eiareport/eia_2012011/ES/ES_PDF/IWMF_ES_English.pdf) [Accessed February 2014].
7. Environmental Protection Department. (2011b) *Explanatory Booklet for the Proposed Integrated Waste Management Facilities*. Available from: [http://www.epd.gov.hk/epd/english/environmentinhk/waste/prob\\_solutions/files/Booklet\\_IWMF\\_English.pdf](http://www.epd.gov.hk/epd/english/environmentinhk/waste/prob_solutions/files/Booklet_IWMF_English.pdf) [Accessed February 2014].



8. Environmental Protection Department. (2011c) *Legislative Council Brief: Development of the Integrated Waste Management Facilities*. Available from: [http://www.epd.gov.hk/epd/english/news\\_events/legco/files/EA\\_Panel\\_110218a\\_eng.pdf](http://www.epd.gov.hk/epd/english/news_events/legco/files/EA_Panel_110218a_eng.pdf) [Accessed February 2014].
9. Environmental Protection Department. (2013) *Integrated Waste Management Facilities*. Available from: [http://www.epd.gov.hk/epd/english/environmentinhk/waste/prob\\_solutions/WFdev\\_IWMF.html](http://www.epd.gov.hk/epd/english/environmentinhk/waste/prob_solutions/WFdev_IWMF.html) [Accessed February 2014].
10. GovHK. (2012a) *Press Releases: LCQ9: Waste management strategies*. Available from: <http://www.info.gov.hk/gia/general/201202/01/P201202010268.htm> [Accessed February 2014].
11. GovHK. (2012b) *Press Releases: LCQ18: Waste management strategies*. Available from: <http://www.info.gov.hk/gia/general/201204/25/P201204250243.htm> [Accessed February 2014].
12. South China Morning Post. (2013) *Activists to Show Why Incinerator Plan should be Thrown Out*. Available from: <http://www.scmp.com/business/article/1362280/activists-show-why-incinerator-plan-should-be-thrown-out> [Accessed February 2014].
13. The Judiciary of the Hong Kong Special Administrative Region. (2013) *Leung Hon Wai v. Director of Environmental Protection and Town Planning Board. In the High Court of the Hong Kong Special Administrative Region, Court of First Instance, Constitutional and Administrative Law List No 49 of 2012*. Available from: [http://legalref.judiciary.gov.hk/lrs/common/search/search\\_result\\_detail\\_frame.jsp?DIS=88279&QS=%2B&TP=JU&ILAN=en](http://legalref.judiciary.gov.hk/lrs/common/search/search_result_detail_frame.jsp?DIS=88279&QS=%2B&TP=JU&ILAN=en) [Accessed February 2014].

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