

45,552,000 cubic meters of landfill gas is currently flared off per year from the 3 HKG open landfill sites

From: James Middleton [mailto:dynamco@netvigator.com]

Sent: 12 January, 2016 11:44 AM

To: 'garypun@epd.gov.hk'

Cc: 'bcheung@epd.gov.hk'; 'cfwong@epd.gov.hk'; 'dleung@epd.gov.hk'; 'pykwong@epd.gov.hk'; 'andychan@epd.gov.hk'; 'ssy@epd.gov.hk'; 'hschan@epd.gov.hk'

Subject: : E(16/0009) Query on current levels of Landfill Gas in Hong Kong

Dear Gary

Thanks for your reply

In 2008 the **LFG** at the 3 sites collected was as follows: 26,600 m3 per hour

Obviously as the landfills get older and larger the LFG would normally increase but I note that the 2014 rate is 12.400/6,450/7,185 = 26,035 m3 per hour which is lower than 2008, of which you state approx 80% (**20,828 m3 per hour**) **would be beneficially used** and the remainder (5,200 m3 per hour/ 124,800 m3 per day / **45,552,000 m3 per year**) is flared off.

That seems an awful lot of wasted methane and relevant pollution caused by the flaring. I understand methane is 21 times more damaging to the environment than CO2 but surely some better use could be made of the gas ?

For example I note that companies like SITA promote liquid biomethane from landfill gas in UK and Europe – why not here too ?
<http://www.sita.co.uk/downloads/Gasrec-web.pdf>

Kind regards,

James Middleton

Chairman

www.cleartheair.org.hk

-----Original Message-----

From: cfwong@epd.gov.hk [mailto:cfwong@epd.gov.hk] **Sent:** Thursday, November 06, 2008 11:24 AM **To:** dynamco@netvigator.com **Cc:** lmc_lau@epd.gov.hk; teresa_leung@enb.gov.hk

Subject: Re: SENT methane - Michael pls post on our site

Dear Mr. Middleton,

Thanks again for your email below to EPD and SEN's offices. I am not sure if you received my response dated 10 Oct (appended below for your easy reference) to your follow up enquiry of 8 Oct. In any case, please see below my reply to your latest enquiry of 4 Nov below.

1. I am afraid that we are not in the best position to advise you why CLP did not develop any utilization scheme for landfill gas in HK. You might like to approach CLP direct on this enquiry.

2. At present, about **26,600 cubic meter / hr** of landfill gas (a mixture of methane, carbon dioxide and other gases) are collected from the three operating landfills in Hong Kong. A substantial portion of the collected landfill gas have been utilized to meet on-site and off-site energy demands. As highlighted in my email of 8 Oct, EPD is in the process of active negotiation with the contractor of the South East New Territories (SENT) Landfill to put the surplus landfill gas recovered on site for off-site beneficial use. CF WONG Waste Facilities Group Environmental Protection Department 6.11.08

2007 figures:

Landfill Gas to Energy at Closed Landfills

Closed Landfills	Quantity of Gas Collected (cubic meter per hour)	Modes of Landfill Gas Utilization	Quantity of Gas Utilized (cubic meter per hour)
Shuen Wan	318	Gas treated and piped to Towngas for use as fuel	307
Jordan	137	Electricity generation for on-	23

Valley		site use and leachate treatment	
Tseung Kwan O Stage I	614	Electricity generation for on-site use	24
Tseung Kwan O Stage II/III	1,271	Electricity generation for on-site use; used for heating in the leachate treatment process	841
Gin Drinkers Bay	170	Used for heating in the leachate treatment process	170
Pillar Point Valley	533	Used for heating in the leachate treatment process	454

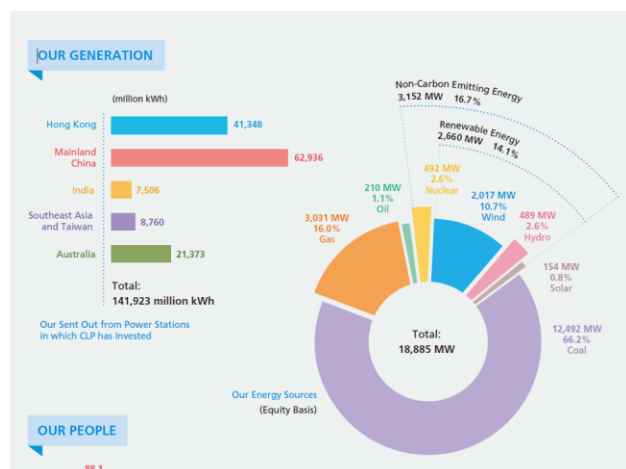
Note: The above figures are average figures in 2007.

Landfill Gas to Energy at Strategic Landfills (current)

Strategic Landfills	Modes of Landfill Gas Utilization	Quantity of Gas Utilized (cubic meter per hour)
WENT	Electricity generation for on-site use and leachate treatment	5,300
SENT	Electricity generation for on-site use and leachate treatment	2,200
NENT	Electricity generation for on-site use and leachate treatment	5,100

In 2007 a total 12,600 m3 per hour (out of 26,600 m3 per hour collected) from WENT, NENT, SENT was beneficially used , Towngas took some and the rest was flared off. By 2015 there was an improvement and only 20% of the like amount was flared off, but still a significant amount that could be used to create liquid biomethane or other beneficial usage.

(note CLP generation fuel mix 2014 only 16% natural gas from total generation in all countries)



-----Original Message-----

From: garypun@epd.gov.hk [mailto:garypun@epd.gov.hk]

Sent: 12 January, 2016 09:50 AM

To: dynamco@netvigator.com

Cc: bcheung@epd.gov.hk; cfwong@epd.gov.hk; dleung@epd.gov.hk; pykwong@epd.gov.hk; andychan@epd.gov.hk; ssy@epd.gov.hk; hschan@epd.gov.hk; "E[KM]1"@epd.gov.hk; "SI[KM]1"@epd.gov.hk; dctk_epd@epd.gov.hk; harriswong@epd.gov.hk; klwan@epd.gov.hk; mclam@epd.gov.hk

Subject: Re: Fw: E(16/0009) Query on current levels of Landfill Gas in Hong Kong

Dear Mr. Middleton,

Thank you for your email dated 1 Jan 2016 regarding the generation and utilisation of LFG in HK. Please see our responses in the following.

The composition of LFG mainly consists methane and carbon dioxide. LFG has been put into beneficial uses in the 3 strategic landfills, including electricity generation meeting the need for the daily operation of the landfill sites and a source of alternative energy for leachate treatment process.

To maximize the beneficial utilization of landfill gas, the Government and landfill contractors have been actively exploring/ identifying viable off-site LFG utilization schemes, such as those in collaboration with public utilities companies in HK. In May 2007, a LFG export scheme, comprising the treatment of LFG at North East New Territories (NENT) Landfill and delivery of treated LFG from NENT Landfill to Hong Kong and China Gas (HKCG)'s gas production plant in Tai Po as alternate fuel, was put into operation.

In late 2014, the Government signed an agreement with the South East New Territories (SENT) Landfill contractor on converting surplus LFG on-site to synthetic natural gas (SNG). Upon commissioning of the SENT scheme, the SNG produced on-site will be conveyed to the HKCG's Offtake Station at Tseng Lan Shue and blended with town gas for injection to HKCG's supply grid.

The LFG collection rates at the three strategic landfills in 2014 are shown in the table below:-

Quantity of LFG collected 26,035 cubic meters per hour (current versus 26,600 m3 per hour in 2007)

	(cu.m./hr)
SENT Landfill	12,400
NENT Landfill	6,450
WENT Landfill	7,185

With the LFG export schemes for NENT and SENT Landfills in place, **about 80% of LFG produced at the three landfills would be beneficially used**. The West New Territories (WENT) Landfill contractor has been actively exploring the possible off-site utilization of surplus LFG collected at WENT. For details of the quantities of landfill gas utilized in the three operating landfills in HK, you can visit the web-link below:

http://www.epd.gov.hk/epd/english/environmentinhk/waste/prob_solutions/msw_lgu.html

In general, **any surplus LFG collected at a particular landfill is flared off** at high temperature according to requirements of safety and environmental management. Feasibility and applicability of other possible beneficial uses of LFG will be considered on a case-by-case basis.

Best regards,

Gary Pun

Environmental Protection Department

"James Middleton" <dynamco@netvigator.com>

To <enquiry@epd.gov.hk> 01/01/2016 12:47

Subject E(16/0009) Query on current levels of Landfill Gas in Hong Kong

EDMS No. Doc. Src.

Query on current levels of Landfill Gas (LFG) in Hong Kong

Dear Sir,

In 2008 from available figures given to us, SENT alone flared off 140,250 cubic meters of LFG per hour per each day

Our LFG queries:

What is the current amount of LFG produced daily in all Hong Kong landfills? WENT NENT SENT

How much of that LFG is used locally onsite to power the plants and leachate treatment?

How much LFG is currently flared off per day/year ?

Is there a known breakdown of methane/CO2/hydrogen sulphide in the LFG ?

How much LFG is currently taken by Towngas per day / year?

<http://www.towngas.com/eng/corp/socresp/envprot/cleanprodion.aspx>

Are there any other beneficial uses made of the LFG ? eg does CLP or HK Electric use the LFG ?

<https://www.camden.gov.uk/ccm/content/environment/air-quality-and-pollution/air-quality/compressed-biomethane-gas-refueling-station/>

Has any consideration been made to convert the LFG to liquid biomethane?

<http://biofuelstp.eu/biogas.html>

<http://www.sita.co.uk/downloads/Gasrec-web.pdf>

Kind regards,

James Middleton

Chairman <http://cleartheair.org.hk>

-----Original Message-----

From: cfwong@epd.gov.hk [<mailto:cfwong@epd.gov.hk>]

Sent: Thursday, November 06, 2008 11:24 AM

To: dynamco@netvigator.com

Cc: lmc_lau@epd.gov.hk; teresa_leung@enb.gov.hk

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CF WONG

Waste Facilities Group

Environmental Protection Department

6.11.08

-----Original Message-----

From: cfwong@epd.gov.hk [<mailto:cfwong@epd.gov.hk>] On Behalf Of lmc_lau@epd.gov.hk

Sent: Wednesday, October 08, 2008 7:19 PM

To: dynamco@netvigator.com

Cc: katharinechoi@enb.gov.hk; swpang@epd.gov.hk; wessex@epd.gov.hk; ywng@epd.gov.hk

Subject: Re: Fw: Landfill methane

Dear Mr. Middleton,

Thank you for your interest in our work, in particular the beneficial use of landfill gas as an alternative source of energy.

We share the view that landfill gas should be put into beneficial uses where feasible. In fact, all our Design, Build and Operate contracts for the three operating landfills in Hong Kong require the contractor to collect landfill gas for suitable beneficial reuses, including electricity generation to satisfy the power demand on site and for direct heating in the landfill leachate treatment process.

The landfill contracts also include contractual provisions encouraging the contractor to explore putting the landfill gas to other beneficial uses. In early 2008, EPD has commissioned a utilisation scheme to export the landfill gas collected from the NENT Landfill to the Towngas generation plant at Tai Po for use as substitution fuel. It is also our hope that similar initiative could be successfully developed for the other two operating landfills. Currently, EPD is in the process of active negotiation with the contractor of the South East New Territories (SENT) Landfill to put the surplus LFG recovered on site for off-site beneficial use.

CF WONG

Waste Facilities Group,

Environmental Protection Department

http://www.epd.gov.hk/epd/english/environmentinhk/waste/prob_solutions/WFdev_OWTF.html

Organic Waste Treatment Facilities

Objectives

The OWTF aims to recycle source-separated organic waste generated from the C&I sectors (mostly food waste) to useful products, thereby minimizing requirement for landfill disposal.

http://www.epd.gov.hk/eia/register/report/eiareport/eia_1762009/index.html

OWTF Phase 1

http://www.epd.gov.hk/eia/register/report/eiareport/eia_1762009/pdf/EIA%20Report/TOC_final%20EIA.pdf

http://www.epd.gov.hk/eia/register/report/eiareport/eia_1762009/html/EIA%20Report/TOC_final%20EIA.htm

OWTF Phase 1 EIA report (AECOM) Feasibility Study

http://www.epd.gov.hk/eia/register/report/eiareport/eia_1762009/Appendices/EIA%20Report/Appendix%203.1.pdf

OWTF 1 emission rate

http://www.epd.gov.hk/eia/register/report/eiareport/eia_2182013/index.htm

OWTF Phase 2