Facts about Hong Kong’s Largest Landfill Gas Power Generation Project

Background

CLP Power Hong Kong Limited (CLP Power) is committed to doing all it can to protect the environment and minimise the impact of electricity generation, as well as to support the Government’s carbon reduction policies to combat climate change and transform Hong Kong into a smarter and greener city. While Hong Kong faces great challenges in the development of large-scale renewable energy projects, CLP Power constantly explores opportunities to develop local renewable energy projects.

Castle Peak Power Company Limited (CAPCO), operated by CLP Power, plans to develop Hong Kong’s largest landfill gas (LFG) power generation project by constructing power generation units in the West New Territories (WENT) landfill which utilises LFG for electricity generation.

LFG Treatment

The WENT landfill in Nim Wan, Tuen Mun, has been in operation since 1993. With an area of 110 hectares, it is Hong Kong’s largest landfill and handles up to 7,300 tonnes of municipal waste a day.

LFG consists of methane (CH₄), carbon dioxide (CO₂) and trace amounts of nitrogen, hydrogen, ammonia, sulphur dioxide and carbon monoxide produced by the decomposition of municipal solid waste. It is flammable, making it a suitable fuel for power generation, and is regarded as a valuable renewable energy source.

Currently, the operator of the site converts some of the LFG to generate electricity for on-site facilities and for waste water treatment, while the remaining gas is flared off according to regulation. CAPCO plans to use the un-utilised, excessive LFG into good use for power generation.
LFG collected in the gas wells at the landfill would be transported to a treatment facility to remove any liquid condensate and vapor contaminants before it is transferred for power generation. The electricity generated would be sent to the power grid of CLP Power.

![Landfill gas generation process](image)

**Project Information**

CAPCO proposes to adopt the Internal Combustion Engine Generator (ICEG) System for power generation, a widely-used technology worldwide for converting landfill gases to power generation. The advantages of the ICEG System include its simple design that allows it to be installed within only about one year, its high efficiency, and its small operating area requirement. In addition, Selective Catalytic Reduction (SCR) facilities would be installed to further reduce nitrogen oxide (NOx) emissions produced during power generation.

![ICEG System](image)

**ICEG System is a widely-used technology worldwide for landfill gas power generation**

Furthermore, underground cables will be constructed to transmit electricity generated from the power generation units to the power grid of CLP Power.
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<tr>
<th><strong>Location</strong></th>
<th>Within WENT Landfill</th>
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<td><strong>Size of Proposed Site</strong></td>
<td>Approximately 0.5 hectares</td>
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| **Generation capacity** | Phase 1: 10MW (Five units), equivalent to 68 million kWh, sufficient to power over 17,000 four-person households for one year  
Phase 2 (to be proceeded subject to the capacity of landfill gas): 4 MW (Two units), equivalent to 27.2 million kWh |
| **LFG Usage**       | Approximately 4,500 m$^3$/hr for phase 1 |
| **Expected Date – Construction Commencement** | Second Quarter 2017 |
| **Expected Date – Beginning of Operation** | Third Quarter 2018 |

**Environmental Benefits**

LFG produced at landfills are regarded as a type of renewable energy source. This proposed waste-to-energy project would allow CAPCO to utilise this valuable energy resource, and accordingly offset its coal-fired power generation, reducing emissions from coal burning. It would help improve the overall air quality of Hong Kong and combat climate change.

CLP Power and CAPCO have conducted assessments on the project’s impact on the environment and will shortly file an application for an Environmental Permit with the Environmental Protection Department. The company will meanwhile seek to complete the relevant agreements and other related statutory procedures. Once approved, it will enter into construction stage. The project is expected to be in operation by the third quarter of 2018.

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