

立法會
Legislative Council

LC Paper No. CB(1) 647/07-08(19)

Ref. : CB1/PL/EA

Panel on Environmental Affairs

Meeting on 28 January 2008

**Background brief on greenhouse gas emissions and
their effects on global warming**

Introduction

Greenhouse gases (GHG) are components of the atmosphere, including water vapour, carbon dioxide (CO₂), methane, nitrous oxide and ozone. Some GHG occur naturally in the atmosphere while others result from human activities. GHG act like a blanket around the earth or the glass roof of a greenhouse, trapping heat and keeping the planet warm. If the concentration of GHG in the atmosphere increases, the average surface temperature of the earth will increase. With more GHG released to the atmosphere due to human activities, such as burning of fossil fuels, deforestation and agriculture, more heat is being trapped near the earth's surface, giving rise to global warming. Associated with global warming are other changes in the climate system, including changes in the frequency and intensity of extreme weather and climate events such as heat wave, cold spells, heavy rain, droughts and tropical cyclone as well as a rise in the sea level. These changes have profound impacts on natural and human systems and are often adverse in nature.

2. There are two major pieces of international agreements related to global warming, namely the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol. UNFCCC is an international treaty signed among member countries of the United Nations (UN) in 1992. Its objective is to stabilize GHG concentrations "at a level that would prevent dangerous anthropogenic (human-induced) interference with the climate system". As of May 2007, 191 countries have ratified the treaty, including China. The Kyoto Protocol is an agreement made under UNFCCC. Countries ratifying this protocol commit themselves to reducing emissions of carbon dioxide and five other GHG or engaging in emissions trading if they maintain or increase emissions of such gases. As of December 2006, 169 countries and other government entities have ratified the agreement.

GHG emissions in Hong Kong

3. The volume of GHG emissions in Hong Kong was about 44.8 million tonnes CO₂-equivalent (CO₂-e)¹ in 2005, accounting for about 0.2% of the global GHG emissions. Approximately, 85% of the total global warming potential (GWP)-weighted GHG emissions in Hong Kong are CO₂. The emissions per capita in Hong Kong were around 6.4 to 6.5 tonnes in recent years which were lower than that of United States of America (about 24 tonnes), Canada (about 24 tonnes), Australia (about 27 tonnes), United Kingdom (about 11 tonnes), Japan (about 11 tonnes), European Union (about 9 tonnes) and Singapore (about 9 tonnes). Hong Kong's carbon intensity, as measured in terms of GHG emissions per unit of Gross Domestic Product (GDP), was 27.6 kilograms per HK\$1,000 of GDP in 2005.

4. The energy sector, mainly electricity generation, is the major source of GHG emissions, accounting for over 60% of the total local GHG emissions. The transport sector, contributing to about 16% of the total emissions, is the second largest emission source.

Responses to climate change

5. The UNFCCC and Kyoto Protocol were extended by the Central Peoples' Government (CPG) to Hong Kong with effect on 5 May 2003. As with other developing countries which have ratified the Kyoto Protocol, China (including the Hong Kong Special Administrative Region (HKSAR)) is not required to achieve any GHG emission limits. Instead, it is required to submit national communications in accordance with the specific requirements of the Protocol by around 2010. In order to assist CPG in fulfilling the obligations under the Protocol, the Administration is required to prepare a HKSAR submission to CPG covering the following -

- (a) Emission inventories of GHG;
- (b) Appropriate measures for Hong Kong to facilitate adequate adaptation to and mitigate climate change;
- (c) Cooperation activities in promotion of development and application of environmentally sound technologies pertinent to climate change;
- (d) Cooperation activities in scientific research related to climate change; and
- (e) Activities in promoting public awareness and disseminating the

¹ CO₂-equivalent is a metric measure used to compare the emissions from various GHG based upon their global warming potential (GWP). The CO₂-equivalent for a gas is derived by multiplying the tonnes of the gas by the associated GWP.

relevant messages.

GHG reduction measures

6. In support of the international efforts in reducing GHG, the Administration has been pursuing a string of measures since the 1990s. These measures include encouraging the power companies to take various measures to maximize the use of liquefied natural gas (LNG) for power generation and to implement demand side management to promote energy efficiency and conservation; reducing power consumption within the Government; promoting the application of the Building Energy Codes covering lighting, air conditioning, electrical, lift and escalator installations through the Energy Efficiency Registration Scheme for Buildings; introducing a mandatory Energy Efficiency Labelling Scheme covering room air-conditioners, refrigerators and compact fluorescent lamps in the initial phase; promoting the use of renewable energy (RE); promoting the use of cleaner vehicles; continuing to maximize the treatment and utilization of landfill gas as fuel substitutes; embarking upon a major tree planting programme to enhance the capacity of CO₂ absorption; as well as raising public awareness and public education with a view to promoting lifestyle and behavioural changes at levels to reduce GHG emissions.

7. In addition, the Administration is prepared to commission a new round of study to tap into the findings of international studies on climate change, particularly those published by the Intergovernmental Panel on Climate Change, and assess the impacts of climate change on Hong Kong. This will provide a solid scientific basis for further development of adaptation and mitigation measures as well as for the preparation of the HKSAR submission to CPG for meeting the national communication obligations under the Kyoto Protocol.

Deliberations by the Panel

8. The subject of GHG emissions and their effects on global warming was discussed by the Panel at its meeting on 28 May 2007 and deputations were invited to express their views. A summary of views of deputations and the Administration's response was circulated vide LC Paper No. CB(1) 2202/06-07 on 26 July 2007. In gist, deputations generally agreed that being a developed city, Hong Kong should make efforts to reduce its GHG emissions through the use of LNG to replace coal in electricity generation, development of RE, control of idling vehicles, introduction of energy tax, development of energy conservation measures and provision of green rooftops etc. Consideration should also be given to setting emission targets for GHG and a timetable for achieving the targets.

9. According to the Administration, Hong Kong had been making strenuous efforts to reduce GHG emissions, albeit it was a relatively small GHG emitter given its small size, low electricity consumption and industrial activities being relocated to

the Mainland. The per capita emission in Hong Kong was around 6.4 to 6.5 tonnes and the carbon intensity also fell by 41% between 1990 and 2005. Members however pointed out that the low emissions per capita were mainly due to the relocation of industries to the Mainland. Query was also raised on the 41% reduction in carbon intensity given that the United States had recorded significant reduction in carbon intensity and yet it had the worst GHG emissions. It was pointed out that if per capita emission data were used, these would have to be compared with economies which were structured in the same way since the reduction in carbon intensity might be attributable to the rapid growth in GDP.

Relevant papers

Information paper provided by the Administration for the Environmental Affairs Panel meetings on 28 May 2007

<http://www.legco.gov.hk/yr06-07/english/panels/ea/papers/ea0528cb1-1666-15-e.pdf>

Information note entitled "Policies and measures for mitigation of climate change" prepared by the Research and Library Services Division

<http://www.legco.gov.hk/yr06-07/english/sec/library/0607in14-e.pdf>

Minutes of the Environmental Affairs Panel meeting on 28 May 2007

<http://www.legco.gov.hk/yr06-07/english/panels/ea/minutes/ea070528.pdf>

Administration's response to deputations' views

<http://www.legco.gov.hk/yr06-07/english/panels/ea/papers/ea0528cb1-2202-1-e.pdf>

Council Business Division 1
Legislative Council Secretariat
22 January 2008