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(Translation)

27 April 2011

Clerk to LegCo Panel on Environmental Affairs  
Legislative Council Secretariat  
3/F., Citibank Tower  
3 Garden Road  
Hong Kong  
(Attn: Miss Becky YU)

Dear Miss YU,

**Meeting of the Panel on Environmental Affairs on 28 February 2011**

Members at the above meeting requested information on the following:-

- (a) Projected electricity consumption in Scenarios 1, 2 and 3, and breakdown of projected electricity consumption by domestic, commercial and industrial users under the three scenarios in 2020;
- (b) Information on domestic and commercial electricity consumption and a comparison on their tariff levels.

The projections extracted from the “Consultancy Report – A Study of Climate Change in Hong Kong” and related information are now summarised in the Annexes to this letter.

At the above mentioned meeting, Members asked for the causes for the fluctuation of local greenhouse gas (GHG) emissions from the “industrial processes and product use” sector between 1990 and 2005 (Table 2.2 of the Final Report) and how the forecast of GHG emissions for this sector was made up to 2030. We would like to advise Members that the local sources of GHG emissions from the “industrial processes and product use” sector mainly include clinker production in the cement manufacturing process, use of hydrofluorocarbons (HFCs) as substitutes for ozone depleting substances in air conditioning and refrigeration systems, use of perfluorocarbons (PFCs) as solvents,

and use of sulphur hexafluoride (SF<sub>6</sub>) in electrical equipment. There was a general rising trend of GHG emissions over the period from 1990 to 2005 due to the increasing use of HFCs serving as an alternative to ozone depleting substances being phased out under the Montreal Protocol, despite there were fluctuations due to variations of servicing needs of the HFC-using equipment during the period. Also, there was a drop in GHG emission from 2002 to 2005 due to importation of clinker for cement manufacture in Hong Kong and the suspension of local clinker production during the period. As regards the projection of GHG emissions for this sector up to 2030, the Consultants forecasted that emissions from use of HFCs would continue with its average rising trend from 2001 to 2005 up to 2030, and that contribution from other sub-sectors would maintain at 2005 levels.

Yours sincerely,

( David T W Wong )  
for Director of Environmental Protection

### Projected electricity consumption in Scenarios 1, 2 and 3, and breakdown of projected electricity consumption by domestic, commercial and industrial users under the three scenarios in 2020

The projections for local energy demand under the three scenarios<sup>1</sup> were drawn up by the Consultants with reference to the past situations and trends based on historical data between 1990 and 2005. The projected growth in electricity consumption as depicted during the study period is mainly attributable to projected growth in local socio-economic activities, and different mitigation measures included in the three scenarios would have somewhat different implications on GDP growth. The historical performance of Hong Kong's energy system and the Consultants' projection are summarised below:

	1990 - 2005 (Historical data)	2005 - 2020 (Consultants' projection)
Population	+19%	+13%
Gross Domestic Product (GDP)	+80%	+63%
Local electricity consumption	+68%	+39%

The projected emission reduction levels of the various scenarios covered by the Study and their implications for the overall economy in 2020 are set out below:

Scenarios	Projections (2005 – 2020)		
	Reduction in carbon intensity	Change in total GHG emissions	GDP growth
Base Case ("Business as usual" Scenario)	-33%	+ 10%	+ 63.3%

<sup>1</sup> Scenario 1 (the "AQO Scenario") included relevant mitigation measures proposed in the Air Quality Objectives (AQO) Review, including increased use of natural gas and renewable energy sources for electricity generation, wider use of road vehicles using clean fuels, and enhanced energy efficiency in the building and appliance sectors.

Scenario 2 (the "Accelerated Scenario") built upon Scenario 1 and included additional proposed measures to increase energy efficiency and reduce energy demand, particularly in the building and transport sectors. It also assumed local sources of renewable energy such as energy from waste treatment by 2020, and electricity imported from Mainland China being maintained at the 2005 level.

Scenario 3 (the "Aggressive Scenario") built upon Scenario 2 and further assumed making full use of natural gas supply guaranteed by the Mainland under the Memorandum of Understanding on Energy Co-operation for electricity generation, and that nuclear electricity imported from the Mainland in 2020 would be able to meet about 50% of local demand for electricity.

“AQO Scenario” (Scenario 1)	- 37%	+ 2%	+ 63.6%
“Accelerated Scenario” (Scenario 2)	- 39%	0%	+ 63.7%
“Aggressive Scenario” (Scenario 3)	- 57%	- 30%	+ 64.1%

A higher projected local energy demand under Scenario 3 vis-à-vis Scenarios 1 and 2 is mainly due to the cost of fuel mix under Scenario 3. As pointed out in “Hong Kong’s Climate Change Strategy and Action Agenda”, the share of imported nuclear power under the fuel mix structure in Scenario 3 would be increased from the current level of 23% to 50%. The proposed change in fuel mix structure is expected to result in a lower overall energy cost and hence it would stimulate more economic activities. Due to increased economic activities associated with the lower energy cost, the Consultants projected that the future electricity consumption in Scenario 3 would be higher than that in Scenarios 2 and 3 notwithstanding a substantial reduction in carbon intensity. Projection of the final energy demand by sectors, including commercial, residential, transportation and industrial have been made by the Consultants which are included in Table 3.5 on Page-B45, Technical Appendix B of the Final Report. The final energy demand values in the Table includes energies such as electricity, coal, gas and oil used by various end-use devices in the sectors defined in the Hong Kong MARKAL-MACRO model. Relevant information in Table 3.5 is now extracted below for reference:-

### *Final Energy Demand of End-use Sectors (TJ)*

	2005	2010	2015	2020	2020 vs. 2005
<b>Commercial</b>					
Base Case	106,222	121,193	150,122	179,315	69%
Scenario 1	106,222	121,210	148,575	171,884	62%
Scenario 2	106,222	121,484	149,178	172,255	62%
Scenario 3	106,222	125,667	151,104	189,068	78%
<b>Residential</b>					
Base Case	52,857	56,049	61,143	70,218	33%
Scenario 1	52,857	55,435	58,853	62,771	19%
Scenario 2	52,857	55,207	59,447	63,112	19%
Scenario 3	52,857	56,527	59,776	67,550	28%
<b>Transportation</b>					
Base Case	111,866	111,577	121,929	131,826	18%
Scenario 1	111,866	109,782	118,351	124,894	12%
Scenario 2	111,866	109,778	118,675	125,734	12%

	<b>2005</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2020 vs. 2005</b>
Scenario 3	111,866	110,041	118,969	127,353	14%
<b>Industrial</b>					
Base Case	24,023	17,301	15,506	14,851	-38%
Scenario 1	24,023	17,034	15,494	14,638	-39%
Scenario 2	24,023	17,057	15,514	14,716	-39%
Scenario 3	24,023	17,999	15,683	17,885	-26%
<b>Total</b>					
Base Case	294,968	306,121	348,700	396,211	34%
Scenario 1	294,968	303,461	341,273	374,187	27%
Scenario 2	294,968	303,526	342,814	375,817	27%
Scenario 3	294,968	310,234	345,533	401,857	36%

N.B. Final energy includes electricity, coal, gas and oil.

### Information on domestic and commercial electricity consumption and a comparison on their tariff levels

Below is a breakdown of residential and non-residential electricity sold and their respective tariff revenue from 2006 to 2010:

	<u>2006</u>	<u>2007</u>	<u>2008</u>	<u>2009</u>	<u>2010</u>
<u>Electricity Sold (GWh)</u>					
Residential	9,841	10,118	10,306	10,826	10,929
Non-residential	30,493	30,735	30,624	30,665	30,933
Total	40,334	40,853	40,930	41,491	41,862
<u>Electricity Tariff Revenue (HK\$b)</u>					
Residential	9.3	9.6	10.2	10.4	10.7
Non-residential	29.1	29.6	30.9	29.9	30.7
Total	38.4	39.2	41.1	40.3	41.4