本署檔號
OUR REF: EP353/01/Pt.19
來函檔號
YOUR REF: CB1/PS/3/08
電　話
TEL. NO.: 25946031
圖文傳真
FAX NO.: 25720306
電子郵件
E-MAIL:
網　址
HOMEPAGE: http://www.epd.gov.hk

Environmental Protection Department
Headquarters
33/F, Revenue Tower,
5 Gloucester Road,
Wan Chai, Hong Kong.

環境保護署總部
香港灣仔
告士打道五號
稅務大樓三十三樓

CB(1) 1537/08-09(02)

Clerk to Panel on Environmental Affairs
Legislative Council Building
8 Jackson Road
Central
Hong Kong
(Attention: Miss Becky YU)

8 May 2009

Dear Miss YU,

Panel on Environmental Affairs
Subcommittee on Improving Air Quality
Follow-up actions arising from the meeting on 16 April 2009

We refer to your letter dated 17 April 2009. Please find attached the requested information:

Attachment 1: Follow-up Actions Arising from the Discussion at the Meeting on 16 April 2009

Attachment 2: Minutes of the meetings of the Advisory Panel

Yours sincerely,

(W C MOK)
for Director of Environmental Protection

Attachment 1

Follow-up Actions Arising from the Discussion at the Meeting on 16 April 2009

I. LC Paper No. CB(1)1057/08-09(01)

(1) To include in the 'Baseline emissions in 2006' in Appendix II to Annex B the percentage of total emission reduced as a result of the full implementation of the Phase I control measures.

The percent of total emission reduced as a result of the full implementation of the Phase I control measures have been included in the "Baseline emissions in 2006" in Appendix II to Annex B of LC Paper No. CB(1)1057/08-09(01) as follows:

Phase I Measures								
		Total Emission Reduced [in % of baseline emission in 2006]				**Cost – Benefit Analysis**[1]		
Emission Capping and Control		SO2	NOx	RSP	VOC	**Cost ($M)**	**Benefit ($M)**	**B/C Ratio**
1.	Increase ratio of natural gas in local electricity generation to 50% with additional emission abatement measures	18.2	26.6	8.9	0.0	2,032[7]	1,803	0.9
2.	Early retirement of aged / heavily polluting vehicles (pre-Euro, Euro I and Euro II commercial diesel vehicles and franchised buses)	0.0	3.3	5.1	0.4	3,882[2]	24,344	6.3
3.	Earlier uptake of latest Euro standard for commercial diesel vehicles of Euro III (assumed to be about 50%)	0.0	0.8	1.3	0.1	2,668[2]	6,134	2.3
4.	Wider use of hybrid / electrical vehicles or other environmentally friendly vehicles with similar performance (20% private cars and 10% franchised buses)	0.0	0.2	0.1	0.4	4,326[2]	2,417	0.56
5.	Ultra low sulphur diesel for local vessels	0.9	0.0	0.3	0.0	378	6,331	16.7
6.	Selective catalytic reduction for local vessels	0.0	0.3	0.0	0.0	249	74	0.30
7.	Electrification of aviation ground support equipment	0.1	0.8	0.4	0.2	224	3.8	0.02
8.	Emission control for off-road vehicles / equipment	0.0	1.0	4.1	0.8	845	2,123	2.5
9.	Strengthening VOC control for	0.0	0.0	0.0	1.7	18	124	6.9

	sealant and adhesives							
	Transport Management							
10.	Low emission zone (banning pre-Euro, Euro I , Euro II and Euro III commercial vehicles) for Central, Mongkok and Causeway Bay	NA	NA	NA	NA	3,696	2,586	0.7
11.	Car-free zone / pedestrianisation scheme for Central, Mongkok and Causeway Bay	NA	NA	NA	NA	42	400	10
12.	Bus route rationalization	0.0	0.2	0.1	0.0	14	548	39
Infrastructure Development and Planning								
13.	Expand rail network	0.0	0.5	0.8	0.5	Note [3]	3,850	Note [3]
14.	Cycling network to major public transport hubs	0.0	0.0	0.0	0.0	836	8	0.01
Energy Efficiency Measures [4] (mostly savings in energy cost)								
15.	Mandatory implementation of Building Energy Codes	0.2	0.3	0.1	0.0	95	2,634	28
16.	Energy efficient electrical appliances for domestic use	0.1	0.1	0.1	0.0	84	2,277	27
17.	LED for street lighting	0.0	0.0	0.0	0.0	47	105	2.2
18.	Tree planting / roof-top greening [5]	NA	NA	NA	NA	6,357	1,603	0.3
19	District cooling system for Kai Tak Development	0.0	0.0	0.0	0.0	2,788[6]	4,047	1.5

Notes:

[1] In its simplest form, the costs and benefits of each policy are quantified and valued in monetary terms. The cost-benefit analysis is subject to a wide range of assumptions used by the consultants for compiling the assessment of different control measures. As these assumptions are subject to change, the findings of the cost-benefit analysis should be read with caution. Nonetheless, it provides a systematic framework to compare the potential cost-effectiveness of different control measures.

[2] The cost of early retirement of the concerned vehicles is calculated based on the residual value foregone of these vehicles over the remaining period of their normal serviceable life. The upfront capital costs required for procuring the replacement vehicles would be higher than the figures set out in the table.

[3] The railway strategy includes North Island Line, Kwun Tong Line Extension, Kowloon Southern Link and Shatin Central Link. The railway strategy will have additional ride-on effect on improvement of air quality. Only benefit is presented.

[4] Benefits include material damage, energy saving, acute and chronic health benefits. For strategies 15, 16, 17 and 19 the majority of benefits are due to energy savings, not health benefits.

[5] No local emission and cost data. Estimates are based on overseas data for roof top greening of 10% of the urban area.

[6] The figure includes both the capital and operational costs of plant for the coming 50 years.

[7] The figure includes estimated costs due to increasing the ratio of natural gas in local electricity generation to 50%. It does not include estimates on additional emission abatement measures, which would be subject to further studies.

'NA' stands for 'not applicable'

(2) To consider ploughing back the medical savings as a result of improved air quality to cover the anticipated increase in electricity tariff and bus fare arising from the increased use of natural gas for power generation and replacement of franchised buses respectively, such that these increases will not be passed onto consumers.

The primary purpose of the cost-benefit analysis is to provide a systematic framework for assessing in very broad terms the relative cost-effectiveness of different proposed control measures. The analysis only focuses on the economic cost of the proposals to the community as a whole and as these proposals are at conceptual stage, the estimates on costs and benefits are subject to uncertainties and variations depending on the timing, implementation details, the market situations and the community's responses, etc. when the individual measures are taken forward. As the economic cost is not equal to the actual financial cost for implementing the proposal, it is not appropriate to compare directly the tariff and fare implications with economic benefit of the proposals.

As for the medical savings due to better air quality in the cost-benefit analysis, they have been estimated by the consultant based on a host of assumptions and are subject to a great deal of uncertainties. They represent no more than the best attempt to assess the potential medical savings in theoretical sense and should, least of all, be taken as any definitive indication on the actual impact on the medical cost or expenditure. Any suggestion of using public funding to cushion the community from possible increase in electricity tariff and bus fare following implementation of the proposed emission control measures, which runs against the polluter-pay-principle, has to be thoroughly deliberated and any possible impact on the medical expenditure should be considered separately. Subject to the views collected in the public consultation, the Government will consider how best the proposed air quality improvement measures are to be taken forward.

(3) To consider imposing penalty on service providers who insist to use more polluting production methods despite the availability of cleaner options.

Under the Air Pollution Control Ordinance, we have imposed emission caps on the local power plants which will continue to be tightened up to ensure, among others, the use of best practicable means and hence, the choice of cleaner options, to prevent the emission of air pollutants from power plants. If they fail to meet the emission cap requirements, prosecution would be initiated. The penalty for non-compliance is a fine of $30,000 in respect of each tonne of excessive emissions on a first conviction and a fine of $60,000 in respect of each tonne of excessive emissions plus imprisonment for 6 months on a second or subsequent conviction. The concerned power plant will also be required to reduce in the following year an extra quantity of emission which is equal to the exceeded quantity of concerned air pollutant.

2. To further ensure strict compliance with the emission cap requirements by the power companies, we have linked their permitted rates of return to their environmental performances in the Scheme of Control Agreements. If the power company exceeds any of their corporate

emission caps by 10% and 30%, their rate of return will be reduced by 0.2% and 0.4%, respectively.

(4) To advise the implementation plan for the first two Phase I control measures, and whether incentives would be offered to encourage participation of the service providers and the public.

We aim to implement these control measures as soon as reasonably possible. For the first Phase I control measure, i.e. to increase the share of local electricity generation by natural gas to 50%, the actual implementation plan will, however, depend on -

(i) the adequate supply of natural gas;
(ii) the lead time required for building additional gas generation units, additional emission abatement measures, the associated gas supply infra-structure; and
(iii) the acceptance of consumers and businesses to bear the additional cost.

Subject to the outcome of the public consultation, we would work out the implementation plan with the power companies as soon as reasonably practicable.

2. For the second Phase I control measure, i.e. early retirement of aged/heavily polluting commercial diesel vehicles, Government has already put in place a $3.2 billion incentive scheme to provide one-off grants to assist owners of aged diesel commercial vehicles to replace their vehicles with new ones that comply with the latest emission standards. Other policy or financial tools to facilitate implementation of this proposed emission control measure would be considered in the light of the outcome of public consultation.

II. LC Paper No. CB(1)1257/08-09(03)

(5) To advise the distribution of exceedances in Attachment 1 over a year and the effect of meteorological factors in this respect.

The distribution of exceedances in Attachment 1 on monthly basis for 2007 and 2008 are given in the tables below.

Number of exceedances in 2007:

Air Pollutant	Averaging time	Concentration (g/m3)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	No. of Exceedances in 2007
SO2	10-min	AQG: 500	0	0	0	11	0	1	0	0	1	0	0	0	13 (No. of 10-min)
	24-hour	IT-1:125	0	0	0	0	0	0	0	0	0	0	0	0	0

		IT-2: 50	11	3	6	7	11	9	12	14	8	4	0	5	90
		AQG: 20	31	18	23	21	24	28	27	25	21	28	25	29	300
RSP	24-hour	IT-1: 150	1	0	1	0	0	0	0	0	1	0	1	4	8
		IT-2: 100	16	5	2	1	2	0	0	0	8	14	10	14	72
		IT-3: 75	25	11	5	9	9	0	0	4	9	20	23	21	136
		AQG: 50	29	19	22	22	19	5	5	8	19	28	30	30	236
	Annual	IT-1: 70 IT-2: 50 IT-3: 30 AQG: 20	Not Applicable												Not Applicable
FSP	24-hour	IT-1: 75	9	1	1	0	1	0	0	0	8	13	4	13	50
		IT-2: 50	25	10	4	10	9	0	0	6	11	22	22	20	139
		IT-3: 37.5	29	16	13	18	16	1	0	8	16	25	28	29	199
		AQG: 25	31	26	27	27	19	3	3	10	23	29	30	31	259
	Annual	IT-1: 35 IT-2: 25 IT-3: 15 AQG: 10	Not applicable												Not Applicable
NO2	1-hour	AQG: 200	14	0	0	5	4	0	0	12	11	16	3	11	76 (No. of 1-hour)
	Annual	AQG: 40	Not Applicable												
Ozone	8-hr	IT-1: 160	0	0	0	2	2	0	0	1	5	8	0	0	18 (No. of day)
		AQG: 100	16	16	8	14	14	1	0	5	19	26	26	24	169 (No. of day)
Mean Temperature (℃)			16.4	19.5	20.2	21.8	26.4	28.4	29.6	28.0	27.7	25.6	20.9	19.3	Not Applicable
Prevailing Wind Direction(degree)			010	090	080	080	080	230	240	240	080	070	350	060	Not Applicable
Mean Wind Speed (km/h)			23.9	21.7	22.7	20.5	16.1	19.1	18.8	21.0	21.4	29.1	28.7	22.6	Not Applicable
Rainfall (mm)			29.6	6.9	27.6	125.5	288.3	490.1	76.9	488.4	102.3	51.7	3.9	15.7	Not Applicable

Number of exceedances in 2008:

Air Pollutant	Averaging time	Concentration (g/m3)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	No. of Exceedances in 2008

SO2	10-min	AQG: 500	0	0	0	0	11	1	6	0	2	0	0	0	20 (No. of 10-min)
	24-hour	IT-1:125	0	0	0	0	1	0	1	0	0	0	0	0	*2*
		IT-2: 50	6	3	5	9	8	15	17	15	6	1	1	0	*86*
		AQG: 20	29	29	29	20	27	28	28	26	24	9	13	22	*284*
RSP	24-hour	IT-1: 150	2	0	0	1	0	0	0	0	0	0	0	1	4
		IT-2: 100	6	8	9	2	1	1	1	0	5	0	6	12	51
		IT-3: 75	17	18	21	6	6	1	2	0	12	10	14	27	134
		AQG: 50	25	27	29	16	15	3	4	3	15	21	22	31	211
	Annual	IT-1: 70 IT-2: 50 IT-3: 30 AQG: 20	Not Applicable												Not Applicable
FSP	24-hour	IT-1: 75	5	10	7	2	0	0	1	0	5	0	3	6	39
		IT-2: 50	17	22	19	6	5	1	2	1	12	12	11	20	*128*
		IT-3: 37.5	22	26	28	16	15	1	3	3	16	17	17	27	*191*
		AQG: 25	29	27	31	25	25	6	5	8	19	26	27	31	*259*
	Annual	IT-1: 35 IT-2: 25 IT-3: 15 AQG: 10	Not Applicable												Not Applicable
NO2	1-hour	AQG: 200	21	5	19	0	0	0	0	2	11	1	6	19	84 (No. of 1-hour)
	Annual	AQG: 40	Not Applicable												
Ozone	8-hr	IT-1: 160	0	0	7	0	5	0	1	2	10	1	0	3	29 (No. of day)
		AQG: 100	13	11	26	15	16	2	4	4	17	26	24	27	185 (No. of day)
Mean Temperature (℃)			15.9	13.3	20.0	23.1	25.3	26.7	28.4	28.4	29.0	26.5	21.9	18.4	Not Applicable
Prevailing Wind Direction (degree)			350	350	070	060	080	200	240	240	090	080	080	360	Not Applicable
Mean Wind Speed (km/h)			22.8	25.5	19.5	21.1	20.2	21.7	18.0	19.9	18.2	28.5	27.4	24.3	Not Applicable
Rainfall (mm)			33.3	27.5	57.2	255.0	191.9	1346.1	471.1	317.0	159.2	144.6	54.3	9.0	Not Applicable

2. As a whole, the air pollution level is substantially lower in summer months (June to August)

due to a number of meteorological factors as follows:

(i) the higher temperatures in summer months induce larger mixing heights, which favours the dispersion of pollutants;
(ii) the rains in summer help to wash out pollutants more frequently; and
(iii) the south-westerly monsoon in summer also helps to replenish the region with cleaner oceanic air.

3. The air pollution level in winter months, however, is much higher because the prevailing north or north-easterly monsoon would bring in more trans-boundary air pollution caused by emission sources outside Hong Kong.

(6) To advise whether Attachment 1 has been worked out using air pollution indices from general monitoring stations and if so, this may not be able to truly reflect the impacts of air pollution on people who have to work long hours at road side.

The figures presented in the said Attachment 1 are those worked out from results of general monitoring stations. The air quality modelling for the purpose of AQO review is designed to predict changes in ambient air quality on a macro scale (i.e. on an area basis). It is not refined enough to predict air quality changes at the roadside, particularly to the extent of the number of AQO exceedances.

(7) To compare Attachment 2 with a city similar to Hong Kong

The acute medical cost figures in Attachment 2 are derived from the local study [1] conducted by health experts of local universities for the Environmental Protection Department by multiplying the percent change in the rate of the health impact with the unit costs of the relevant health impacts (i.e., the cost of spell in hospital by patients admitted for the concerned diseases and the productivity losses, the "willingness to pay" for the avoidance of the health impact). The unit costs of health impacts would vary from one place to another and hence it would not be possible to make a meaningful comparison with other cities.

2. Notwithstanding the above, as shown from the following table, the percent change in rate of the major health impacts observed locally, other than those for RSP which we have less risk factors according to the health studies conducted by the local universities base on local health data, are generally compatible to or higher than those adopted by U.K. for assessing the acute health effects of London and other parts of U.K.

Pollutant	Health Impacts	% change in rate per ug/m3	
		Hong Kong	United Kingdom [2]
PM-10	Acute mortality	0.040	0.075

	Hospital admissions	0.050	0.080
SO2	Acute mortality	0.162	0.060
	Hospital admissions	0.076	0.050
O3	Acute mortality	0.062	0.060
	Hospital admissions	0.055	0.070
NO2	Acute mortality	0.081	--
	Hospital admissions	0.054	0.050 [3]

[1] *'Final Report for the Provision of Service for Study of Short Term Health Impact and Costs due to Road Traffic Related Air Pollution' prepared by the Chinese University of Hong Kong and the Hong Kong University for the EPD in March 2002*

[2] *UK Department of Health 'Quantification of the Effects of Air Pollution on Health in the UK', 1998; and Department of Health 'Statement on Short Term Associations between Ambient Particles and Admissions to Hospital for Cardiovascular Disorders', 2001, presented in Table A2.2: Concentration-response functions recommended by COMEAP, Annex 2 (Valuing the health benefits associated with reductions in air pollution – recommendations for valuation) to "An Economic Analysis to inform the Air Quality Strategy - Updated Third Report of the Interdepartmental Group on Costs and Benefits", July 2007*

[3] *UK considers that PM10 and NO2 are highly correlated and there is uncertainty about whether the association between NO2 and respiratory hospital admissions is due to NO2 itself or merely an indirect reflection of the effect of PM10. For this reason, they do not use of the NO2 figure in their main analyses.*

(8) To provide a written response to the joint submission from four academics from the Department of Community Medicine, HKU regarding the Consultant's preliminary findings of the Air Quality Objectives Review. To also arrange a meeting with the academics concerned with a view to narrowing any discrepancies.

The written response (in English only) is appended in **Annex 1**.

(9) To optimize the benefit of the one-off grant of $ 3.2 billion for early replacement of pre-Euro and Euro I diesel commercial vehicles, consideration should be given to extending the scheme to franchised buses and other types of vehicles including motorcycles.

The one-off grant has been designed to cover all commercial vehicles except franchised buses because franchised bus companies have already put in place their own bus replacement programmes which have to be agreed with the Transport Department. Under the normal arrangement, franchised buses have a service life of 17 years. Accelerating the pace of the bus replacement programme may have an impact on the bus fare and the operation of bus companies. In addition, bus suppliers may have problem meeting the surge in demand for new buses (which

can amount to over 1,000 new buses per year) within a short timeframe. All these relevant factors will have to be fully taken into account when considering the case for extending the $3.2 billion one-off grant to cover franchised buses.

2. Motor cycles are not included in the current one-off grant scheme because they are petrol driven and the whole motor cycle fleet only accounts for about 1% (based on 2007 data) of the total vehicular emission of respirable suspended particulates and nitrogen oxides.

(10) To advise the emission performance of the latest model of diesel private car and petrol car.

Petrol cars and diesel cars use different fuels and combustion technologies and hence their emissions are different. Among the two, diesel cars emit a lot more nitrogen oxides and particulates than petrol ones. The two are the key air pollutants at the roadside. Due to technological advancement in abating the emissions of diesel vehicles, the emissions of the two pollutants from the future generation of diesel private cars will become lower. However, the corresponding emission from petrol private cars will also be further reduced at the same time. The Euro V emission standards for petrol and diesel private cars to be implemented by the European Union in 2011 show that the RSP emission from diesel cars will be tightened to the same level as petrol cars. However, their NOx emission is still 3 times higher than that of petrol cars. For further details please see Table below.

Table: Euro 5 petrol and diesel private car emission standards

	Limit values (mg/ km)				
	Carbon monoxide (CO) [1]	Hydrocarbons (HC)	Oxides of nitrogen (NOx)	Hydrocarbon and oxides of nitrogen (HC + NOx)	Particulates (PM)
Euro 5 Petrol	1000	75	60	-	5
Euro 5 Diesel	500	-	180	230	5

[1] The CO concentration in Hong Kong is very low. We are already in compliance with the ultimate limits of WHO AQG.

2. As NOx is a major roadside air pollutant in Hong Kong, we shall continue to require diesel private cars to be as clean as petrol cars before they can be registered.

本署檔號 OUR REF: EP353/01/Pt.18
來函檔號 YOUR REF: CB1/PS/3/08
電 話 TEL. NO.: 2594 6031
圖文傳真 FAX NO.: 2572 0306
電子郵件 E-MAIL:
網 址 HOMEPAGE: http://www.epd.gov.hk

Environmental Protection Department
Headquarters
46/F, Revenue Tower,
5 Gloucester Road,
Wan Chai, Hong Kong.

環境保護署總部
香港灣仔
告士打道五號
稅務大樓四十六樓

Annex 1

Professor A.J. Hedley,
Professor H.K. Lai,
Professor S.M. McGhee,
Professor C.M. Wong,
Department of Community Medicine,
School of Public Health,
The University of Hong Kong,
Pok Fu Lam Road, Hong Kong

8 May 2009

Dear Professors Hedley, Lai, McGhee and Wong,

Air Quality Objective Review

Thank you for the comments on our paper CB(1) 1257/08-09(03) to the Sub-committee on Improving Air Quality of the Legislative Council (the Subcommittee). We originally proposed to meet in early May but unfortunately, I understand that your side cannot meet during this period due to other prior commitments of some of the participants. We will further liaise with you to find a mutually convenient time for discussion. To facilitate a more structured discussion, our response to your comments are set out at Annex. We will also forward our response to the Subcommittee for reference.

We look forward to meeting with you very soon.

Yours sincerely,

(W C MOK)
for Director of Environmental Protection

c.c. Ms Christine Loh

Annex

Response to Comments on Paper CB(1) 1257/08-09(03) to the Sub-committee on Improving Air Quality of the Legislative Council

(a) Very little useful data on which to base an interpretation of Arup's review

The AQO Review Consultant has yet to complete its study. The LegCo paper CB(1) 1257/08-09(03) has been prepared in response to the request of the Subcommittee to provide it with a summary of the Consultant's initial findings ahead of the compilation of the final report. As such, the summary has left out a lot of the details. However, the Consultant will present these details in its final report so that readers can better understand the rationale of its recommendations.

(b) Where is the decision analysis for the AQO?

Having regard the guiding principles of the WHO and the practices of environmentally advanced countries, the Consultant has adopted the following principles in recommending the proposed new AQO:

(i) Protection of public health: To uphold the principle of protecting public health as the key parameter.

(ii) Progressive, forward-looking: To adopt a progressive, forward-looking approach having regard to local situation, long term goal of attaining WHO AQGs, technological developments and international practices in revising AQOs

(iii) Regular review mechanism for updating AQOs: To achieve progressively the long term target of achieving the ultimate AQGs

Applying the above principles and taking account of the local circumstances that our air quality, especially the particulate levels, are strongly affected by external sources, the Consultant recommends in its initial findings the adoption of the following combination of ITs and AQGs of WHO as the proposed new AQO, i.e.:

- WHO AQGs for nitrogen dioxide, sulphur dioxide (10-min), carbon monoxide and lead
- WHO IT-2 for PM-10
- WHO IT-1 for sulphur dioxide (24-hr), PM-2.5 and ozone

The above recommendation is in general comparable with the air quality standards of EU, which are among the most stringent, except those for PM-10 and PM-2.5 for which more practical limits need to be proposed because of the high particulate levels in the Pearl River Delta Region.

The Consultant has assessed the feasibility of achieving the proposed new AQOs by mathematical air quality modelling. On the basis that Guangdong will continue to align itself with the best practices in the world to curb emissions from its power, transport and industrial sectors, it has shown that the full implementation of the proposed Phase I control measures would enable the achievement of the proposed

new AQOs subject to suitable allowance for exceedance similar to those provided by other advanced countries.

(c) Population exposures

Unlike some countries and economies such as USA and Australia, we apply our AQOs not only to outdoor ambient air (i.e., excluding roadsides), but also to non-occupational, outdoor locations where a person might reasonably be expected to be exposed over the relevant averaging period, as practised in UK and New Zealand. These locations include peak roadside sites for protection of the population living or working at roadsides.

It should be noted that the measurements at roadside stations represent air quality at urban kerbsides with heavy traffic and street canyon effects. It is meant to measure street level exposure by pedestrians or workers who stay very close to the vehicle exhaust emissions for prolonged period. At elevated levels further away from the ground, the pollutant concentrations gradually reduce to ambient levels as monitored by the general air stations (with sampling points from around 15 metres to 25 metres above ground). As a matter of fact, the majority of the people in Hong Kong are living and working at high rise buildings at levels well above the general stations and therefore are exposed to the ambient air pollution levels. We therefore do not agree with the assumption that 50% of the population is exposed to pollutant concentrations same as those measured at our roadside stations.

Notwithstanding the above, please be advised that in assessing the health benefits from those traffic management measures, e.g., Low Emission Zones, which are specifically aimed at reducing roadside air pollution levels, the Consultant has taken roadside levels in full account and estimated the population affected conservatively as the total of all resident population plus one-third of the transient population (i.e. people visiting or working in the district who receive an exposure of no more than 8 hours each day) for the districts.

(d) The Arup AQOs are not AQGs

As clearly pointed out by the WHO, the AQGs are not meant to prescribe the air quality standards that must be adopted by all countries in the world. Instead, they "are intended to inform policy-makers and to provide appropriate targets for a broad range of policy options for air quality management in different parts of the world". It states clearly that "[n]ational standards will vary according to the approach adopted for balancing health risks, technological feasibility, economic considerations and various other political and social factors, which in turn will depend on, among other things, the level of development and national capability in air quality management".

The WHO has, therefore, not specified any number of exceedances but leave the individual country/economy to decide on the most acceptable figures based on it own local circumstances. In page 183 of the "WHO Air Quality Guidelines Global Update 2005", WHO clearly says in the "Compliance criteria" section that "[w]hen the standards set are to be legally binding, criteria must be identified to determine compliance. This is quantified through the number of acceptable exceedances over a certain period of time."

Other than those for particulate matters whose levels, as explained above, are heavily influenced by regional air pollution and hence more practicable AQOs are necessary, the proposed numbers of exceedances are comparable with those of other advanced countries such as EU, USA and Australia.

(e) The Arup AQOs will not protect health

WHO has clearly stated that the interim targets "are proposed as incremental steps in a progressive reduction of air pollution and are intended for use in areas where pollution is high. These targets aim to promote a shift from high air pollutant concentrations, which have acute and serious health consequences, to lower air pollutant concentrations. If these targets were to be achieved, one could expect significant reductions in risks for acute and chronic health effects from air pollution".

While it would be our long term goal to progress towards the ultimate AQGs, we may not be able to deliver the ultimate AQGs for a number of pollutants, particularly those for particulate matters which are subject to major regional influence, even after implementing all the stringent emission reduction measures identified by the Consultant. Nevertheless, achieving the new AQOs proposed by the Consultant would help promote better air quality and significantly reduce the health risks for acute and chronic health effects from air pollution.

Regarding the EIA Ordinance, quite contrary to your comments, the enforcement of its provisions has been helping to ensure achievement of the AQOs, which are now being reviewed and to be tightened up, through pre-emptive actions during the planning stage of the major projects. As a result of the EIA process and other control measures, we have achieved a continual reduction of our air pollutant emissions that prevents our air quality from deteriorating. Since our implementation of a comprehensive vehicle emission control programme after 1999, the roadside RSP, SO2 and NOx concentrations have dropped by around 20%. For the ambient air quality, the worsening air pollutant trends have levelled off over the last 5 years.

(f) Distributions of pollutants, AQOs and exceedances

As a general observation, any statistical methods that project the mean values based on a very small percentage of extreme values will be subject to great uncertainties and the results could deviate significantly from actual observations. In the absence of the validation details of your statistical methods for estimating the distribution of local air pollutant concentrations, we can only compare your prediction with the actual measurement data that we have. The comparison has shown quite a significant discrepancy between your estimates and the actual data. For example, according to your prediction by the statistical model, for SO2, the 24-hour AQO of 125 ug/m3 with 3 exceedances allowed could give an annual mean of 43 ug/m3. However, as shown in the following tables with the actual number of exceedances from 2003 to 2008, the annual mean with 3 exceedances should only be about 20 ug/m3.

	2003		2004		2005		2006		2007		2008	
	Ex. [1]	Mean [2]	Ex. [1]	Mean [2]	Ex. [1]	Mean [2]	Ex. [1]	Mean [2]	Ex. [1]	Mean [2]	Ex. [1]	Mean [2]
General Stations	3	17	18	25	2	22	5	22	0	21	2	20
Roadside Stations	1	17	2	24	0	22	0	21	0	22	1	23
All Stations	4	17	20	25	2	22	5	22	0	22	3	21

[1] Number of exceedances of 24-hour average greater than 125 ug/m3
[2] Annual mean (ug/m3)

We do not agree with your suggestion that "A better indicator of population exposures, the average of general and roadside stations, is 64ug/m^3 with an average of 195 days exceedances of the current AQO (hourly based) or 199 days of exceedances using 24 hour moving average." Firstly, we doubt the appropriateness of representing the population exposures by simply taking the average of the general and roadside pollutant concentrations, as the majority of the public are exposed to the air quality in the ambient air instead of roadside. Secondly, we do not know how you came up with 195 or 199 days of exceedance of the current daily AQO for RSP (180 ug/m3) in 2007. From our 2007 monitoring results, there were only 3 and 2 exceedances of the RSP daily AQO (180 ug/m3) at the general and roadside stations respectively. We look forward to the basis of your estimation.

As for the Tap Mun exceedances presented in the submission to EA Panel's Sub-committee on Improving Air Quality, they are the actual number of exceedances determined by the actual monitoring data.

Regarding the proposed new AQOs for SO2, the Consultant proposes the use of WHO's 10-minute AQG. However, for the 24-hour AQOs, the Consultant considers that it would be more practical to adopt the standard currently used by the EU and UK, which is already one of the most stringent standards among other advanced countries/economies. It is also not aware of any countries/economies that have adopted the WHO AQG, though it recommends that attainment of WHO AQGs should be the long-term goal.

For the proposed new AQOs for PM-10, as explained above, our air quality levels are heavily influenced by regional air pollution and hence a set of more practical limit values is considered more appropriate.

(g) Types and sources of information

The Consultant has used the findings of the results presented in the report - "Final Report for Provision of Service for Study of Short Term Health Impact and Costs due to Road Traffic-related Air Pollution" - in full consultation with Professor TW Wong, one of the principle investigators of that study. It considers the findings applicable to the cost benefit analysis in this study. Indeed, similar excess risk factors have also been quoted in the recently published article on determination of cost of our air pollution[1].

[1] Hedley, A.J. et al, "Air Pollution: Costs and Paths to a Solution in Hong Kong – Understanding the Connections Among Visibility, Air Pollution, and Health Costs in Pursuit of Accountability, Environmental Justice, and Health Protection", J. Toxicol. & Environ. Health, Part A, Vol. 71, pp. 544-554, 2008 – Table 3

We do not know whether the Consultant has had some misunderstanding in its communication with you. It has informed us that it had made attempts at an early stage of the study to have discussions with Prof. Hedley but had received no response. It had also told us that questions had also been put forward to Dr McGhee but no response was also received from her.

(h) Chronic Health Effects

As stated in the UK's "An Economic Analysis to inform the Air Quality Strategy – Updated Third Report of the Interdepartmental Group on Costs and Benefits, 2007", "[t]here are only a handful of studies of this type. There are two main studies from the United States (Dockery et al 1993; Pope et al 1995; 2002)". As such, even the UK's cost estimates presented in the report made reference to these studies. Adopting the same methodology used by the UK is considered appropriate and give the best estimates, at least up to present moment, on chronic health effects.

(i) Discounting

The discount rate varies from one place to another and it is not appropriate to adopt UK's discount rates without qualification. The figure used by the Consultant, which was consistent with those advised by the Finance Services and Treasury Bureau, should be more appropriate for our local circumstance.

Regarding the cost and benefit assessment period, a cut-off of 50 years is adopted by the Consultant for practical reasons. Firstly, after 50 years the discounting procedure reduces the present values to such a small amount that they would have little impact on the findings. Moreover, it would also be difficult to determine what the baseline against which the strategies are assessed would be like in 50 years and beyond from now. This would not be just for the health effects, which constitute one half of the assessment, but also for the energy, transport and industrial sectors which are the subject of the policy interventions. The technological change/improvements and variations in price and costs would occur over time and the ability to predict these with certainty will decrease as the forecasting period is lengthened.

Environmental Protection Department
May 2009

(Excessive Risks and 95% Confidence Intervals (CI) for Mortality, Hospital Admissions and Family Doctor Visits per 10 ug/m3 Change in Pollutant)

Attachment 2

Minutes of the meetings of the Advisory Panel

As a follow-up action arising from the discussion at the meeting on 19 March 2009 (referring to item (6) of CB(1) 1257/08-09(01)), the minutes of the first five meetings of the Advisory Panel are attached in **Annex 2**. The minutes of the sixth meeting are being circulated to members for comments. We will submit the minutes of the sixth meeting to the Subcommittee once they are finalized.

Annex 2

Advisory Panel on Review of the Air Quality Objectives and Development of a Long Term Air Quality Strategy

Minutes of the First Meeting

24 July 2007 at 10:30a.m., Conference Room, 33/F., Revenue Tower, Wan Chai

Present

Ms. Anissa Wong	(Chairperson / EPD)
Mr. Carlson Chan	(EPD)
Mr. Tse Chin-wan	(EPD)
Mr. Pang Sik-wing	(Secretary /EPD)
Miss Susanna Lai	(EPD)
Mr. L. K. Shiu	(EPD)
Mr. Joe Fong	(EPD)
Mr. C. Y. Mak	(EPD)
Dr. Ng Cho-nam	(HKU)
Mr. Kenneth Chan	(GHKFA)
Mr. S. H. Chan	(CLP)
Mr. Alan Lee	(HKCTOA)
Mr. C. T. Wan	(HKE)
Mr. Joseph Wong Pang-sui	(HKAIC of SME)
Mr. Timothy Peirson-Smith	(Executive Counsel Ltd)
Dr. Chow Kit-bing	(DC)
Mr. Leung Siu-tong	(DC)
Professor Wong Tze-wai	(CUHK)
Mr. W. Y. Ho	(ENB)
Miss Pamela Lam	(FHB)
Mr. Gordon Chong	(THB)
Mr. Sam Tsoi	(Arup)
Dr. Kin Lo	(Arup)
Ms. Isis Lai	(Arup)
Ms. Fanny Wong	(Arup)
Ms. Dorothy Lam	(Arup)

Absent with Apologies

Professor Frank Lee	(HKPU)
Mr. James Graham	(JEC)
Professor Alexis Lau	(HKUST)
Dr. Alfred Tam	(Asthma Association)
Mr. Kim O Chan	(HKIP)
Mr. Aaron Ng Hoi-san	(Tai Wo Motors Ltd)
Development Bureau	

Action

Agenda Item 1: Introduction of Members

1. **The Chairperson** welcomed all members to the first Advisory Panel meeting on the Review of Air Quality Objectives and Development of a Long Term Air Quality Strategy. She then introduced the members to each other and briefed them on the background of the commissioning and objective of the Study.

Agenda Item 2: Terms of Reference of the Advisory Panel

2. **The EPD** briefly explained the terms of reference circulated to members before the meeting on 10 July 2007, which are to advise the Government on the directions, approaches and methodologies of the Study; and to review and comment on Study outputs and findings as well as the draft Final Report to ensure quality and completeness. As there were no comments from members, the Terms of Reference of the Advisory Panel were confirmed without amendment.

Agenda Item 3: Brief introduction on the Study by EPD

3. **The EPD** gave a brief introduction on the Study to members of the Advisory Panel.

Agenda Item 4: Presentation of the draft Inception Report by the Consultant

4. **The EPD** invited **the Consultant** to deliver the PowerPoint presentation of the draft inception report to the Advisory Panel.

Agenda Item 5: Comments and discussions on the draft Inception Report

Objectives and Standards

5. **A Member** mentioned that the philosophy of the AQO from the EPD website is the protection of public's health and the best use of air. The philosophy of air quality standards may differ from different countries. For the USEPA, the rationale for establishing air quality standards is strictly on health basis which is not detrimental to health. **A Member** suggested identifying clearly the philosophy of Hong Kong AQO in the objectives of this Study, whether we need establishing a new set of AQO to protect the public health at all costs or to balance health protection with other considerations such as economic and political reality.

Action

6. **A Member** commented that willingness to pay is a good approach under the Cost Benefit Analysis (CBA) as it is often difficult to evaluate life and health. He added that the consultant should however be aware of the hidden cost and some external impact of air quality, and pay attention to enumeration of cost when carrying out the CBA.

7. **A Member** further commented that it is important to understand the rationale behind the different air quality standards set by other countries. **A Member** gave an example that the USEPA based the air quality standards on their own long term health studies while WHO and other European and Asian countries did not have their long-term health studies and therefore also relied on the USEPA's studies.

8. **A Member** expressed his concern on the definition of air quality objectives and the review methodology. Due to other factors that may keep Hong Kong away from complying with the WHO standards, he believed that there may be a longer term vision by certain time frame in order to comply with the WHO standards.

9. In regard to the AQO, he raised the issue of regional dominant influence of external environment from Mainland China. He suggested the consultant to investigate ways to collaborate closely with the PRC Mainland officials to formulate achievable targets. Other **Members** echoed the same issue. **The Consultant** acknowledged that cross-boundary collaboration is a major issue which would be reviewed in the Study.

10. **The EPD** proposed to circulate to the members previous papers issued to the Legislative Council reporting the government's progress on regional collaboration on air quality management issues. EPD

11. **A Member** quoted the Chief Executive's speech that a fund will be granted to the industrial parties for installation of environmental protection system in order to meet the requirement set by the Mainland China government.

12. **A Member** also commented that the consultant should find out a balance point not to damage the survival of Small and Medium Enterprises (SME) groups in Hong Kong while setting up new regulations and action plan for air quality protection.

13. **A Member** commented that the WHO guidelines should be reviewed in a local context with regard to the "unique cocktail" of air pollutant mixture in Hong Kong resulting from industrial emissions from various sectors. He commented that

parameters other than e.g. PM2.5 or SO2 etc should be included. **A Member** said that the levels of toxic chemicals such as organics and heavy metals in air were low but EPD has been monitoring them. **The EPD** explained the monitoring of toxic air pollution in Hong Kong.

14. **The EPD** said that the department has been carrying out very comprehensive monitoring of toxic air pollutants at two of EPD's monitoring stations. He agreed with a Member's comments that the concentration of toxic air pollutants were at low levels. There is no specific standard established worldwide but the monitoring result shows that Hong Kong's levels are, in general, lower than other major urban cities.

15. **A Member** commented the number of existing roadside monitoring stations is not enough.

16. **A Member** queried whether the air quality guidelines are sustainable as the WHO may issue another updated set of air quality criteria. **A Member** expressed that poor air quality is not sustainable and indicated that other European countries or the US have set a realistic interim or final target to achieve the objective.

17. **A Member** raised his concerns about air quality objectives versus standards. He opined that objectives are the means to benchmark air quality management system and are the targets to be achieved, whereas standards are for control and enforcement. He mentioned that air quality objectives had been used as the standards for assessing planning projects which would have implication to the EIAO. He suggested the authority could set long-term objectives as the goal to achieve while setting short-term standards for planning projects to comply with. **The EPD** responded that the EIA dimensions had been included in the study and would be reviewed. **A Member** commented that the AQO in Hong Kong should be regarded as the standards. He added that if a construction project could not even pass the current air quality standards, it shows that such project will impose damage to the environment and that it will unlikely pass the future standards which would be more stringent.

18. **The EPD** recapped comments from the members and added it was a fundamental issue to set interim goals for AQO as it has direct implication on the regulatory aspects which applies to the community. She added that it was necessary to benchmark or to make reference to international practices to maintain the competitiveness of Hong Kong as a world city.

19. In response to the comments made by members, **the Consultant** considered

that in conceiving the approach of the study, the IRM model identified air as a resource for control of health risk, and for reduction of emission from different industrial sectors; and Air Quality Guidelines as an ultimate goal through implementing control measures on different industrial sectors such as transport, energy, urban planning etc. The Study will aim to optimize a scenario to balance issues for all these sectors using the IRM model. The influence of the PRD region has been considered by including all emission inventories from Hong Kong and PRD region in the PATH model from which pollution prediction will be based on.

20. **A Member** suggested adding enhancement of quality of life as one of the objectives of the Study.

21. **A Member** commented that when evaluating the control strategy with PATH and IRM model, the consultant should consider all factors that affect the air quality of Hong Kong including those from the PRD region.

Study References

22. **A Member** suggested the consultant to obtain comprehensive and useful data/information from EPD past papers, literature conducted by CUHK/ HKU, World Bank Report 2002 & 2003, etc.

Public Engagement

23. **A Member** reminded the importance of transparency when explaining the Study to the community, especially the rationale behind the IRM model. **The Consultant** explained the engagement process consists of two stages, an internet email account to gauge initial comments from the general public and a 1,000-people survey conducted by a professional survey company.

24. **A Member** commented that the public had lost faith on the Air Pollution Index and it might be an opportunity to restore the faith. **The Consultant** responded the composition of Air Pollution Index will be reviewed in the Study.

25. **A Member** commented it is important to obtain a representative public opinion survey report and be aware of the response rate.

26. **A Member c**ommented sufficient time for the public engagement process should be provided throughout the Study and that it should not be set at the final stage.

Action

27. **A Member** said that education to the public during the engagement process was also important. **The Consultant** acknowledged the advice and would take this into consideration.

28. **A Member** suggested including public forum and District Council visits during the public engagement process.

29. **The EPD** said there would be a website for this Study and a press release would be prepared to inform the public on the commencement of the Study. EPD

Agenda Item 6: Any Other Business

30. **A Member** queried on the credential of the consultant team. **The Consultant** explained the study team is capable of delivering the project with the support from specialists of various aspects and the experienced staff of the Consultant.

31. **A Member** requested to have a fixed date of meeting and report submission date schedule for the Advisory Panel. **The EPD** said a tentative list of meeting dates will be circulated to members with the minutes. EPD / Consultant

32. In response to a Member's enquiry, **the EPD** said the study report and future documents will be provided to members in electronic format unless upon request otherwise from members.

33. In response to a Member's enquiry, t**he EPD** responded that members are welcome to send *additional* comments regarding the draft inception report within 2 weeks from the meeting for the Consultant's incorporation. All / Consultant

34. **The EPD** reminded members that all working papers and study reports are to be kept confidential. Members may refer to the secretariat regarding enquiry or related details that will be handled in a coordinated manner.

35. It was agreed by Advisory Panel and members that the meeting on 10 August 2007 will be cancelled.

There being no other business, the meeting was adjourned at 1:00pm. The next meeting would be held in September 2007 to be confirmed by the Advisory Panel.

Minutes of the Second Advisory Panel Meeting of the Review of Air Quality Objectives and Development of a Long Term Air Quality Strategy Held on 3 December 2007 at 2:00 p.m.

Present

Ms. Anissa Wong	(Chairperson / EPD)
Mr. Carlson Chan	(EPD)
Mr. Tse Chin-wan	(EPD)
Mr. Pang Sik-wing	(EPD)
Ms. Susanna Lai	(EPD)
Mr. Benson Yeung	(EPD)
Mr. C. Y. Mak	(EPD)
Ms. Alice Tang	(EPD)
Dr. Ng Cho-nam	(HKU)
Professor Frank Lee	(HKPU)
Professor Alexis Lau	(HKUST)
Professor Wong Tze-wai	(CUHK)
Mr. Alan Lee	(HKCTOA)
Mr. S. H. Chan	(CLP Power)
Mr. C. T. Wan	(HKE)
Mr. Joseph Wong Pang-sui	(CPU)
Mr. Leung Siu-tong	(DC)
Mr. C. T. Wong	(THB)
Mr. Harry Lai	(ENB)
Mr. Ng Ho San	(Tai Wo Motors Ltd)
Ms. Pamela Lam	(FHB)
Mr. Kim O Chan	(HKIP)
Mr. L. M. Lui	(Arup)
Mr. Sam Tsoi	(Arup)
Dr. Kin Lo	(Arup)
Mr. Samuel Chan	(Arup)
Ms. Fanny Wong	(Arup)
Ms. Dorothy Lam	(Secretary / Arup)

Absent with Apologies

Mr. Timothy Peirson-Smith	(Executive Counsel Ltd)
Dr. Alfred Tam	(Asthma Association)
Mr. James Graham	(JEC)
Mr. Kenneth Chan	(GHKFAL)
Ms. Wong Yuet-wah	(Planning & Lands Branch, DB)
Dr. Chow Kit-bing	(DC)

In Attendance for Agenda Item 3:

Professor Roy Harrison	(Birmingham University)

In Attendance for Agenda Item 4:

Professor Ignatius Yu	(CUHK)

Action

1. **The Chairperson** welcomed all members to the second Advisory Panel meeting of the Review of Air Quality Objectives and Development of a Long Term Air Quality Strategy.

2. **The Consultant** introduced their **Sub-consultants** to the Advisory Panel members.

Agenda Item 1: Confirmation of Minutes of the Last Meeting

3. The minutes of the last meeting held on 24 July 2007 were confirmed without amendment.

Agenda Item 2 : Matters Arising

4. Referring to para. 10 of the minutes of last meeting, previous papers submitted to the Legislative Council reporting the government's progress in regional collaboration on air quality management issues were circulated to members.

5. Referring to para. 29 of the minutes of last meeting, a press release announcing the commencement of the Study and the conduct of the 1st Advisory Panel meeting was issued. A webpage devoted to the Study had also been set up at the EPD

Action

website.

6. Referring to para. 31 of the minutes of last meeting, a list of tentative meeting dates was circulated to members.

7. No adverse comment was received on the draft Final Inception Report.

8. After the issue of the Final Inception Report in August 2007, an addendum to the Final Inception Report was prepared to address some additional comments from one of the members. The addendum was confirmed without amendment.

Agenda Item 3: Presentation on UK and WHO Experiences in Formulating the Air Quality Guidelines

9. **The Consultant** gave a brief review on the background of the Study and invited their **Sub-consultant** to present on the philosophy of international air quality standards.

10. In response to **a Member's** query on whether there was an international trend to consider NO_x and Ozone as one parameter when formulating control measures, **the Sub-consultant** said he would not add the two pollutants together as it would then be difficult to describe the net effect in health impact research due to changes in the individual pollutants, thus making it difficult to be taken on board on policy grounds. He added that efforts had been made to reduce both pollutants although it was technically difficult to do so.

11. **A Member** asked for the reason why the UK did not include VOC emission reduction as a measure under immediate consideration since reduction of VOC emission could improve ozone concentration. **The Sub-consultant** responded that ozone formation in the UK was NO_x limited, therefore reducing VOC emission would have a minimal effect on reducing the ozone concentration. He added that this may not apply to Hong

Kong's situation.

12. **A Member** queried how particulate matter monitoring data in the UK would compare with the EU and WHO standards as the UK was measuring Black Smoke (BS) in the past while the EU and WHO were using particulates (such as PM_{10} and $PM_{2.5}$) as the indicator. **The Sub-consultant** stated that there used to be 2000 sites across the UK measuring BS, but the number had been reduced to 20 sites nowadays for the purpose of recording long-term trends. The UK had been measuring PM_{10} since 1991 and $PM_{2.5}$ in recent years and more stations measuring PM_{10} and $PM_{2.5}$ would be set up under the requirement of the air quality directive on particulate matter.

13. **A Member** asked **the Sub-consultant** how the transboundary pollution issue was taken into account when setting the UK's interim air quality target. He also sought advice from **The Sub-consultant** on this issue in the context of Hong Kong. **The Sub-consultant** said that UK was suffering transboundary air pollution, in particular particulate matter and ozone from mainland Europe. The issue was being addressed by setting national emission ceilings for all member countries of the EU. Regarding the Hong Kong situation, **the Sub-consultant** suggested emission reduction scenarios be evaluated by a high-quality numerical model segregating pollution from sources within Hong Kong from those transboundary sources. Two scenarios could be made with the first scenario making best assumptions in forecasting the future situation of emissions beyond the Hong Kong border without calling for any changes to the emissions policy of neighboring cities, and the second scenario embarking on a political process to discuss with the neighbouring cities on emission reduction.

14. **The EPD** queried whether the first scenario would be a realistic and practical option for Hong Kong to implement control measures on its own, taking into account its geographical location and given the relative size of emission of Hong Kong compared to the neighbouring cities. **The**

Action

Sub-consutant responded that it would depend on what the target pollutants were. It might be a feasible option to control carbon monoxide locally when local traffic was the major pollutant source. He added that roadside air quality could still be improved for particulate matters by implementing measures within Hong Kong. However, he anticipated that other than a few minor situations concerning roadside air quality, the general air quality would not have significant improvement unless an agreement on emission reduction could be reached with the Mainland authorities.

15. **A Member** said that since developments in the Pearl River Delta (PRD) were not easy to predict or control, the ability of Hong Kong to achieve the air quality standards was constrained to a certain extent. He commented that it was necessary to beef up the collaboration aspect of the Study by making the review results known to the counterparts in the PRD region by means of, say, a joint review exercise. In addition, he mentioned that population growth in the next 10 to 15 years should be taken into account as it would have a big impact to the air quality in future. **The EPD** responded that the study team was fully aware of the importance of pursuing improvement to Hong Kong's air quality in the context of regional collaboration. EPD had shared with Guangdong Environmental Protection Bureau (GDEPB) at a meeting with them earlier regarding the commissioning of the Study and study approaches. EPD would continue to work closely with their counterparts in GDEPB, particularly on data exchange for emissions projection. **EPD**

16. **A Member** shared another **Member's** concern over the need to strengthen regional collaboration. However, he believed that it was equally important for Hong Kong to step up efforts to control local emissions. He mentioned that according to a previous EPD study conducted jointly by HKU and CUHK, there was a good portion of the population being affected by locally-generated pollution. He therefore

considered that it was important to reduce local emissions and roadside pollution levels. **A Member** echoed another **Member's** view and added that both Hong Kong and Guangdong were actually working on ways to reduce roadside emissions, noting that there had also been nationally directed initiatives to improve air quality, such as the 8-6-3 major studies using PRD cities as the testing ground. By reducing roadside pollution levels, there would be tangible health benefits for the population.

17. **The EPD** asked **the Sub-consultant** about the air quality standards being adopted in the UK's air quality strategy since 1997. **The Sub-consultant** responded that the standards were derived in the light of the recommendations by the "Expert Panel on Air Quality Standards", which was an advisory committee formed by the UK Government. The panel had further proposed numerical guidelines for a range of pollutants including carcinogens not covered in WHO's guidelines. As for those pollutants not addressed by the panel, the WHO 1987 guidelines were used. **The EPD** asked whether there was any plan for the UK government to update her air quality standards and objectives in light of the WHO AQG 2005 Updates. **The Sub-consultant** said although there had not been any formally announced plan, he anticipated it would almost be certain that UK would adopt the WHO AQG 2005 as their long term air quality strategy.

18. **The EPD** asked why some apparently reasonable measures were being discarded or no longer under consideration in the UK. **The Sub-consultant** responded that it was based mainly on the results of cost-benefit analysis. He further explained that the measures assessed were ranked according to their cost effectiveness. However, such information might not be of direct use in Hong Kong as the cost-benefit considerations in both places might be different.

Agenda Item 4: Presentation on Local Experiences in

Action

Health Effects due to Air Pollution

19. Members noted the presentation given by **the Sub-consultant** on local experiences in health effects due to air pollution.

Agenda Item 5: Presentation on the Draft Review Report

20. Members noted the Review Stage findings set out in **the Consultant's** presentation.

Agenda Item 6: Comment and Discussion on the draft Review Report

A Member reminded the consultant to pay attention to the fact that the particulate matter and ozone levels as shown in the presentation for the US should be a statistical mean in percentile rather than a maximum value. He added that it was also important for the study to consider whether Hong Kong should adopt statistical percentile approach in order to exclude the maximum values. **A Member** also reminded that the averaging time to be adopted for the standard of the various pollutants should be evaluated using past monitoring data. **The Consultant** acknowledged and agreed to consider the advice.

Consultant

21. **A Member** commented that in preparation for the emission projection, economic growth would not necessarily be associated with an increase in emissions as emission reduction could still be achieved as a result of technological advancement. **The Consultant** responded that it was the study team's intention to underline the rising trend of emission if air policy initiatives were not carried out. Various mitigation measures, either structural or technical, would fit in the time span of the assessment year to identify mitigation measures in place. The outcome would be incorporated into the recommendation stage. **The Sub-consultant** said that was also a great deal of uncertainty in any attempt to predict the future emission trend

in Europe. Two scenarios were adopted in attempting such prediction - the first scenario assumed that planned legislation would take into account the measures agreed by the EU; the second scenario assumed that there would be strong political will to adopt more stringent control measures with less emphasis on economic cost.

22. In response to **a Member's** query on the implications of the AQO for EIA and other planning issues, **the Sub-consultant** said that there were two possible approaches to deal with the matter - the first was simply to announce the AQO for the concerned parties to comply; and the second to introduce transitional arrangement with a view to meeting the new objectives over a period of time. Whichever approach was used, it would boil down to sound policy considerations and pragmatism. **A Member** added that a separate set of standards for EIA might need to be developed to handle the unique scenario of EIA process.

23. **A Member** commented that the availability of potential measures for emission reduction would form an important part for setting the emission targets or air quality objectives because the technology or policy being considered might no longer be available in the future due to cost ineffectiveness or political reasons. **The Sub-consultant** responded that one could always use legislation to drive the technology in order to achieve the target. **A Member** commented that the emission targets should be set as a goal for everybody to achieve, rather than making reservation to accommodate possible failure of control measure such as Electronic Road Pricing.

24. **A Member** asked whether the consultants had taken into account the fact that the air pollution from Pearl River Delta would improve gradually as a result of a new series of stringent environmental protection regulations formulated by the Guangdong government in early 2007. He added that the HKSAR Government and the trade had sent a delegation to Guangxi, Hunan, Jiangxi, etc. to seek opportunity of moving

	Action
some manufacturers to the inner provinces which could help improve the air quality of PRD. **The Consultant** said that the proposal of moving the industry further north would be taken into account in the assessment scenarios.	**Consultant**
25. **A Member** commented that it would not be a good proposal to move polluting industries in the PRD region to inner provinces as they would simply pollute other places. **The Consultant** explained that the polluting industries in the PRD region would be relocated with better integrated planning which could ultimately reduce the pollution level. **The EPD** added that the HKSAR Government was aware of such plan and would liaise closely with the mainland provincial governments to be kept up-to-date of such arrangement.	**EPD**
26. Referring to page 25 of the Draft Review Report, **a Member** clarified that the significant reduction of SO_2 between Year 1993 to 1997 was in fact attributed to a power company's imported nuclear energy supply and the usage of natural gas for power generation since 1996 in addition to the Flue Gas Desulphurization Programme mentioned in the Report. **A Member** would furnish the relevant materials via email to the consultant to incorporate into the Final Review Report. **The Consultant** acknowledged the comments.	**power company/ Consultant**
27. **The ED** asked how the consultant's statement that all the four key pollutants except SO_2 were highly influenced by regional contributions would relate to the formulation of recommendation at the later stage of the Study.	
28. **The Consultant** responded that the next stage of work was to model the respective contribution of PRD vs Hong Kong. Regarding the mitigation approach, he mentioned that detailed modeling results would be generated to apportion the contribution of PRD and HK and then workout the overall effect. He added that based on the contribution result, one would be able to draw up possible control measures to reduce	

Action

the emissions from both sides.

29. **A Member** commented that, taking ozone as an example, it would be difficult to differentiate HK and PRD emission for secondary pollutants when atmospheric chemistry was involved. **The Consultant** responded that to simplify the analysis, a quadratic function would be adopted to work out the relationship based on the European IAM assessment method.

30. **A Member** commented that it might involve very complicated photochemistry to trace the precursors for the formation of ozone – whether they were from local or regional area. **The Consultant** responded that a sensitivity test would be carried out to determine if the source was NO_x or VOC limited depending on the mitigation measures. **A Member** reminded the consultant of the seasonal effect on the analysis.

Consultant

Next Stage of Work

31. **The Consultant** briefed members on the proposed cost-benefit analysis to rank different control strategies and to determine the socio-economic implications and technological practicality.

32. Referring to the cost-benefit approach, **a Member** said that the impact on health benefit resulting from mitigation measures could be quantified in dollar terms and that sensitivity analysis must be built in because different valuation methods could give rather different results.

33. Referring to the comparison of HKAQO against other international standards, **the Consultant** sought members' view on benchmarking the AQS with those adopted by other countries or WHO. **A Member** commented that the study team should consider whether Hong Kong needed another AQS apart from the current AQO and how such AQS, if established,

Action

should be used. He also suggested not to use terminologies that were not commonly used in other countries, such as Air Quality Criteria (AQC) introduced in the Review Report. **The EPD** agreed that it was necessary to have an air quality management system with terminology familiar to the international community. **A Member** suggested to consider adopting the WHO ultimate AQG as the AQS for Hong Kong.

34. **A Member** asked if any US representatives were present at the WHO review group. **The Sub-consultant** responded that there were American leading scientists participating in the WHO study.

35. **A Member** suggested the consultant to collect regional data especially from Asian countries such as Malaysia and Korea to evaluate the current situation in Asia. He also suggested that setting the emission target at a level 20%-40% tighter than the existing level should be a feasible option for achieving the air quality objectives. **Consultant**

36. **A Member** asked if there were other practical ways in formulating the strategy besides the adoption of WHO guidelines in setting AQS for Hong Kong, as the WHO guidelines might not be achievable in 30 years from today. **The Sub-consultant** responded that it would be more desirable to adopt WHO guidelines as the long term aspirational and challenging target if the reduction of air pollutant exposure was the long term goal for Hong Kong.

37. **A Member** said that there were studies on more realistic estimation of emission rather than the no control scenario. He suggested to make further study to come up with a feasible strategy. **A Member** reminded the consultant to bear in mind as to what level the reduction of 20%-40% was to be compared with (whether it was from a realistic estimation or no control scenario) as it could yield very different results. **The Consultant** acknowledged the advice. **Consultant**

Action

38. Referring to the implementation of revised standard on slide no. 39 of the presentation, **a Member** supplemented that the adoption of mass transit system and urban planning in relation to dispersion of pollutants would be important in the overall strategy. In addition, regarding the additional measures, he suggested that the Singaporean Quota Permit System which controlled the overall growth of motor vehicles could be further considered. **The Consultant** responded that the Quota Permit System was a good system to control the vehicle growth but it would induce people to keep their vehicle for a longer period of time which would result in many old vehicles still being used in the city.

39. **The EPD** suggested that in developing the emission inventory under the no control scenario, the consultant should include the new infrastructural projects announced in the Chief Executive's Policy Address as they would have impact on the air quality.

Consultant

40. **A Member** expressed concern on the monitoring stations in terms of their location and number. He also asked whether AQO was applicable to roadside stations in other countries. **The Consultant** responded that the coverage and siting of EPD's monitoring stations would be reviewed in the next stage of work. **The Sub-consultant** said that it was inevitable that the landscape surrounding a monitoring station would change through development and that should be taken into account in interpreting the measurement data. He added that in the US, the AQS did not apply to the roadside whereas in the EU the limit values were applicable to everywhere.

41. **A Member** questioned whether the population policy would be treated as an input or output in this Review Study. **The Consultant** responded that population projection would serve as an input to the model as it was not an intention to control population growth as a mitigation measure. **The Sub-consultant** responded that there was neither population control nor immigration policy being adopted in the UK.

Action

However, he added that the UK government had projection on the use of energy, water and transportation based on the population growth. **A Member** echoed another **Member's** views on the influence of population growth on environmental health. On the other hand, he disagreed with the Chief Executive's suggestion that HK required larger population to sustain growth and alleviate the problem of aging population.

42. **A Member** said that population was an important issue for planning in the coming decades but it was very difficult to predict Hong Kong's future population. He added that there was a review mechanism for the HKSAR Government to update the population projection every 2 to 3 years.

43. **A Member** agreed that the current monitoring network of the EPD would need to catch up with the urban developments. He suggested that monitoring stations at different air intake levels should be considered in the future. He also commented that the sampling height of the current roadside monitoring stations at 3m was way above the human breathing zone and would thus have underestimated the pollution level.

44. **A Member** commented on the engagement process with the general public as part of this Study. He said that the public was more concerned about matters such as taxation that might affect their livelihood. He suggested to present the key points of the Report in layman terms for the benefit of the public.

45. **The EPD** explained that there would be two consultation forums, one to be held on 18 December 2007 for the professionals and the second forum to be held in January 2008 for the general public. The Study materials would be packaged in such a way to facilitate comments from the target groups and the public on key areas. She added that the structure of the public forum was still under discussion and would welcome suggestions from the members. **A Member** was concerned about media arrangement for the two forums. He stated that

ALL

Action

media played an important role in guiding the public opinions. **The EPD** responded that it was not intended to have media presence at the professional forum but the media would be present at the second forum for the general public. **A Member** suggested that a briefing to the media on the Study would help improve transparency.

Agenda Item 7: Any Other Business

46. **The EPD** welcomed any comments from members regarding the Draft Review Report by 14 December 2007 for incorporation to the Final Review Report. **ALL**

47. In response to the request of a Member, **the Consultant** would send a soft copy of the PowerPoint presentation by email to members for reference. **Consultant**

48. There being no other business, the meeting was adjourned at 5:00pm. The next meeting would be held in March 2008 and the date to be confirmed nearer the meeting.

Minutes of the Third Advisory Panel Meeting of the Review of Air Quality Objectives and Development of a Long Term Air Quality Strategy Held on 29 April 2008 at 2:30 p.m.

Present

Ms. Anissa Wong	(Chairperson / EPD)
Mr. Carlson Chan	(EPD)
Mr. Benny Wong	(EPD)
Mr. Pang Sik-wing	(EPD)
Ms. Susanna Lai	(EPD)
Mr. Benson Yeung	(EPD)
Mr. C. Y. Mak	(EPD)
Ms. Alice Tang	(EPD)
Dr. Ng Cho-nam	(HKU)
Professor Frank Lee	(HKPU)
Professor Alexis Lau	(HKUST)
Mr. Harry Lai	(ENB)
Ms. Alice Yeung	(FHB)
Mr. Rico Chan	(Planning & Lands Branch, DB)
Mr. C. T. Wong	(THB)
Dr. Alfred Tam	(Asthma Association)
Mr. Timothy Peirson-Smith	(Executive Counsel Ltd)
Mr. S. H. Chan	(CLP Power)
Dr. Chow Kit-bing	(DC)
Mr. C. T. Wan	(HKE)
Mr. Kim O Chan	(HKIP)
Mr. Aaron Ng	(Tai Wo Motors Ltd)
Mr. Wilfred Lau	(Arup)
Mr. Sam Tsoi	(Arup)
Dr. Kin Lo	(Arup)
Mr. Michael Whitbread	(Arup)
Mr. Paul Kent	(Arup)
Ms. Fanny Wong	(Arup)
Ms. Dorothy Lam	(Secretary / Arup)

Absent with Apologies

Mr. Joseph Wong Pang-sui	(CPU)
Professor Wong Tze-wai	(CUHK)
Mr. Leung Siu-tong	(DC)
Mr. Kenneth Chan	(GHKFAL)
Mr. Alan Lee	(HKCTOA)
Mr. James Graham	(JEC)

Action

1. **The Chairperson** welcomed all members to the third meeting of the Advisory Panel on the Review of Air Quality Objectives and Development of a Long Term Air Quality Strategy. She continued that the purpose of meeting was to brief members on the interim assessment findings in the Formulation of Recommendation Stage of the Study including a menu of proposed control measures.

Agenda Item 1: Confirmation of Minutes of the Last Meeting

2. The minutes of the last meeting held on 3 December 2007 were confirmed without amendment.

Agenda Item 2 : Matters Arising

3. Referring to para. 15, 25 and 30 of the minutes of last meeting, a meeting was held with the Guangdong Environmental Protection Bureau (GDEPB) on 1 February 2008 to update on the progress of the AQO Review Study and discuss the issue of regional emission projection and updating. A copy of the Review Report in Chinese was provided to GDEPB at the meeting for their retention and information.

4. Referring to para. 46 of the minutes of last meeting, comments provided by members were incorporated into the Review Report. A response to comment was prepared by the consultant to address the points raised by a Member on the Review Report. There were no adverse comments received

from members on the Final Review Report.

Agenda Item 3: Presentation on the Interim Assessment Findings in the Formulation of Recommendation Stage

5. **The Consultant** gave a brief introduction on the background of the powerpoint presentation [file sent to members by EPD by email on 28.4.2008]. **The Consultant** then made the presentation on some possible emission control measures for Hong Kong with reference to overseas experiences.

6. **The EPD** thanked the consultant for the presentation and summarized its contents to include a) an overall air quality management framework comprising components such as a mechanism for periodic review of the air quality objectives, emissions budgeting for different sectors, and better coverage of the EPD air quality monitoring network; and b) control measures based on successful overseas experiences. She emphasized the cost-benefit analyses therein were very preliminary and meant to only provide the readers a feel of the situation.

7. Referring to slide #12 of the presentation, **a Member** asked about the status of the LNG terminal - the EIA of which was approved by the EPD a year ago. **The EPD** responded that the Government acknowledged the environmental benefits of using LNG as a fuel source and was currently assessing some proposed options for building the LNG terminal in Hong Kong. She however reiterated that the purpose of this Study was to propose a set of recommendations as to whether and how to review the HKAQOs and to seek input from the community before the Government formulated the relevant control policy. The progress of any individual control initiative should be outside the ambit of this Advisory Panel.

8. On slides # 20 and 21, **a Member** asked what would be the expected range of fare increases for the local ferries. **The Consultant** responded that the cost-benefit analysis would

assess the additional costs incurred by the ferry industry in terms of their fuel and operational costs, which would not necessarily translate into fare increases. The eventual outcome would also depend on the existing regulatory mechanism to control ferry fare increases.

9. **A Member** suggested that the majority of emissions from the marine sector would be from foreign vessels and thus the International Maritime Organization (IMO) would come into the picture. **The EPD** supplemented that there were on-going discussions to tighten marine emissions within the IMO and it would probably take time for any international agreement to be reached. **The Consultant** responded that the priority should be to deal with the local marine vessels first as they would not require international negotiations, and then proceed to discuss with the international community on the control of emissions from oceangoing vessels.

10. On slide #23, **a Member** asked if the increase in power consumption as a result of electrification of ground support equipment in the airport had been taken into account in the analysis. **The Consultant** replied that such increase in power consumption would be taken into consideration.

11. On slide #40, **a Member** commented that the West Kowloon Cultural District, South East Kowloon Development, Wanchai Phase II and other new district-wide areas were some likely candidates for adopting district cooling system. **The EPD** asked the consultants how the assumption of a 20% conversion of existing cooling systems had been worked out. She also queried the feasibility of converting and combining existing individual systems into the proposed district cooling system. **The Consultant** explained the 20% figure was sourced from the work of the Swire Group who had been considering converting their existing individual cooling systems to a district cooling system in Quarry Bay. **The Consultant** supplemented that there were a number of studies on district cooling system conducted by the government since 2000 which

also looked into the institutional framework for implementing the system.

12. **A Member** queried why the ratio of increase in LNG power generation and the reduction in emissions given in slide #12 were not in simple proportion. **The Consultant** responded that there was already an existing base of power generation by LNG in Hong Kong (about 22%) and that would explain the absence of a direct ratio between the two figures of interest.

13. **A Member** also asked why the vehicle permit quota system in slide #15 should only apply to private vehicles. **The EPD** queried if the quota system should apply in accordance to the polluting strength of the different types of vehicles. **The Consultant** responded that most diesel vehicles were commercial vehicles and thus if a quota system was to be applied to these vehicles, the associated economic activities would be adversely affected. The consultant would rather suggest other measures to control emissions from these commercial vehicles such as by early uptake of vehicle engines of higher Euro standard.

14. **A Member** pointed out the need for a more effective arrangement for members to offer their views instead of going through each of the proposed control measures at this meeting. He believed the control measures must have been substantiated by detailed calculations/analysis and that members should offer their comments separately by making use of their expertise and experiences. He also considered the proposed control strategy to be adopting a bottom-up approach. In response, **the Consultant** said that despite the bottom-up approach adopted in the proposed strategy, top-down policy support from the government as well as support from the general public would be very important.

A Member reminded that energy security must be considered very seriously if 100% power generation by natural gas was to be

recommended. He also commented that it would be good to adopt on-shore power supply, but whether such a requirement was to be specified in the lease conditions as mandatory or optional would have much bearing on the practicability of this control measure.

15. **A Member** commented, and echoed by other **Members**, that in addition to vetting the emission reduction potential of the control measures in numerical terms, the criteria for selecting the more effective measures should take into account the spatial context of the reduction potential, i.e. the possibility of eliminating pollution 'hotspot' *or* reducing pollution levels to bring about immediate health benefits to those receptors in the vicinity of an emission source. **A Member** emphasized the health benefits associated with pollution reduction in the vicinity of the receptors should be one important criterion for selecting the more effective control measures. **The Consultant** agreed and added that measures such as pedestrianisation, low emission control zone and reduced car parking spaces would probably result in air quality improvements at localized areas while any reduction in the overall emissions to ambient air might not be significant.

16. **A Member** commented that the range of uncertainty associated with the emission inventory, modeling results, emission reduction potential and cost estimation should be clearly stated. **The Consultant** explained that management procedures adopted widely in the financial sector to address the issue of uncertainty would be used in this study. In addition to the best estimated values, the range and extent of uncertainty would also be presented.

17. Referring to slide #29 on electronic road pricing, **a Member** commented that the figures quoted from a previous study should be comprehensive enough to include important benefits such as any revenue generated from the proposed measure. The consultant should also clarify the data source for calculating the emission reduction potential. **The Consultant**

agreed that some control measures such as congestion charging scheme were not designed primarily to address air pollution problem. **The EPD** encouraged the consultant to make reference to any previous studies by other government departments/bureaux to determine if the environmental benefits of any of the proposed measures should be taken as a bonus to the original purpose of the measure in question.

18. **A Member** commented that the consultant should take into consideration the development trend of Government's policy on emission control.

19. **A Member** reiterated that general air pollution affected public health over a long duration of time. There were also air pollution hotspots locally, e.g. high roadside pollution in Central and Causeway Bay. He suggested the existing monitoring network of EPD should be expanded to cover these hotspots so that the public could decide for themselves whether to go visit these places or not.

20. **A Membr** stated that although acute health impacts due to air pollution were important, long-term chronic impacts must not be overlooked. He suggested that in addition to the four criteria air pollutants under review, other air toxins that were being controlled in the EU and carcinogens such as diesel particulates should also be considered in formulating suitable control measures for Hong Kong.

A Member pointed out the limitation of the PATH model in estimating secondary pollutants such as fine particulates and ozone which nevertheless were the two most important pollutants affecting Hong Kong. This limitation of the model should be highlighted at the start when presenting the model results.

23. **A Member** commented that the government should take a more holistic approach to encourage our community to adopt a more environment friendly lifestyle - such as to drive less and to

use more friendly materials for building construction, than to just control the emissions.

24. **A Member** highlighted the importance to have public support and commitment to the control measures. She suggested the consultant to approach the District Councils for their input, particularly on those controls under Energy Efficiency Management. She added that the timing now was good to systematically review the bus routes and railway network as an overall emission control strategy.

25. **A Member** reminded that cost-benefit analysis for the proposed measures should also consider other aspects such as their sustainability, e.g. energy security, and any adverse side effects.

26. **The EPD** pleaded for members' advice to modify the proposed menu of controls by refining the analysis of the recommended options, and by grouping different controls to tackle specific issues such as improving the ambient pollution level, protecting local receptors, engaging the community, etc.

27. **The EPD** suggested the formation of two working subgroups with an aim to regroup the recommendations, strengthen the analyses and recast their priority. She proposed one subgroup should focus on transport/health while the other should be on power/energy. Members were welcome to join either one or both of the subgroups whereas government departments, such as EMSD, would be invited to join the subgroups as well.

28. **A Member** asked and **the EPD** confirmed that the next Advisory Panel meeting should be held in the first week of July 2008 to review the revised menu of controls, aiming to have a draft Action Plan ready in August 2008.

29. **A Member** asked to have the various control measures listed and presented in the form of a matrix, to state clearly the emission reduction potential of individual measures and

concerning which sector. He opined that the transport sector would have more direct impact on the health of the receptors but the power sector would seem to be doing the bulk of the work to reduce emissions. **A Member** responded that the estimated reduction potentials were indicative only and not air quality improvement in discrete terms at the receptor and hence, a matrix presentation of the controls would not serve any useful purpose. He then asked if the consultant would use another model to assess pollution concentrations at the street level.

30. **The Consultant** explained that the PATH model was used to determine any improvement in ambient air quality before and after applying a control measure and thus the effectiveness of the measure in question. **A Member** emphasized that the PATH model was not refined enough to assess pollution concentrations at street level. **The Consultant** supplemented that the modeling results would be used to show the relative concentration levels and not the absolute values. He continued that the consultant would consider other approaches to assess street level concentrations and would further discuss this with EPD. Consultant

31. **A Member** commented that the proposed control measures should integrate with the committed or on-going planning strategies, e.g. the recommended railway expansion in HK 2030 and the recent planning guidelines for building density and ventilation. **A Member** commented there might not be enough resources to determine if this study would be in line with new developments on all other fronts. **The EPD** supplemented that certain planning studies should have been factored into the modeling parameters of this study. **The Consultant** added that future planning parameters such as road network development would be included in the emission inventory projections.

32. **A Member** pointed out that fuel cost in the power industry, for example, was so volatile that it would be difficult to provide a credible cost figure for the public to comment. **The**

Action

EPD responded that while the cost figures from the cost-benefit analyses were meant to be indicative only to help prioritize the measures, their limitations and constraints should be adequately explained. She reiterated the usefulness to present the control measures in a quantitative manner for the sake of presenting the economic implications in more discrete terms.

33. **A Member** pointed out that to spend the coming two months to refine the control measures would seem to be a bit excessive. Two **Members** both commented that there were still much work to be done and many more meetings to be held to complete the task. **The Consultant** said the consultant would try their best to stick to the original work schedule despite the uncertainties ahead.

34. **The EPD** proposed to hold the 4th Advisory Panel meeting in the first week of July 2008. **The EPD** suggested that members should provide their major comments on the proposed control measures to the consultant prior to the subgroup meetings to be held in early June 2008. ALL

Agenda Item 4: Any Other Business

35. There being no other business, the meeting was adjourned at 5:30 p.m. The next meeting would be held in July 2008 and the date to be confirmed nearer the meeting.

Minutes of the Fourth Advisory Panel Meeting of the Review of Air Quality Objectives and Development of a Long Term Air Quality Strategy Held on 3 July 2008 at 2:00 p.m.

Present

Ms. Anissa Wong	(Chairperson / EPD)
Mr. Carlson K.S. Chan	(EPD)
Mr. Benny Wong	(EPD)
Mr. Pang Sik-wing	(EPD)
Ms. Susanna Lai	(EPD)
Mr. Benson Yeung	(EPD)
Mr. C. Y. Mak	(EPD)
Ms. Alice Tang	(EPD)
Professor Frank Lee	(HKPU)
Professor Wong Tze-wai	(CUHK)
Professor Alexis Lau	(HKUST)
Mr. Harry Lai	(ENB)
Ms. Alice Yeung	(FHB)
Mr. C. T. Wong	(THB)
Mr. Joseph Wong Pang-sui	(CPU)
Mr. Timothy Peirson-Smith	(Executive Counsel Ltd)
Dr. Alfred Tam	(Hong Kong Asthma Society)
Mr. S. H. Chan	(CLP Power)
Mr. C. T. Wan	(HKE)
Mr. Alan Lee	(HKCTOA)
Mr. Aaron Ng	(Tai Wo Motors Ltd)
Mr. Wilfred Lau	(Arup)
Mr. Sam Tsoi	(Arup)
Dr. Kin Lo	(Arup)
Mr. Paul Kent	(Arup)
Ms. Fanny Wong	(Arup)
Ms. Dorothy Lam	(Secretary / Arup)

Absent with Apologies

Mr. Kim O Chan	(HKIP)

Dr. Ng Cho-nam	(HKU)
Dr. Chow Kit-bing	(DC)
Miss YUEN Wai Yin, Amy	(Planning & Lands Branch, DB)
Mr. Leung Siu-tong	(DC)
Mr. Kenneth Chan	(GHKFAL)
Mr. James Graham	(JEC)

Action

1. **The Chairperson** welcomed all members to the fourth meeting of the Advisory Panel on the Review of Air Quality Objectives and Development of a Long Term Air Quality Strategy.

Agenda Item 1: Confirmation of Minutes of the Last Meeting

2. The minutes of the last meeting held on 29 April 2008 were confirmed without amendment.

Agenda Item 2 : Matters Arising

3. Referring to paragraph 30 of the minutes of last meeting regarding correlation between modeling results and street level pollutant concentration, **the Consultant** stated that the PATH modeling result would be used to reflect the changes over time and as a correction factor for roadside monitoring results. **The Consultant** supplemented that statistical regression analysis would be conducted to provide estimation on roadside air quality. **A Member** suggested the consultant to highlight the uncertainties on the regression analysis.

Consultant

4. Referring to paragraph 34 of the minutes of last meeting, **the EPD** noted that two working sub-groups were formed for discussion on the control measures. **The Consultant** supplemented that minutes of the sub-group meetings will be circulated subsequent to internal QA procedures.

Consultant

Action

Agenda Item 3: Presentation on the Briefing on the Assessment Findings in the Formulation of Recommendation Stage

5. **The Consultant** presented the assessment findings of the Formulation of Recommendation Stage.

6. **A Member** suggested having both cost figures and benefits listed in the presentation. **A Member** also commented that without the cost information the Cost Benefit Analysis was only half-way completed. **The Consultant** explained that the data was under revision and would be included in the full report. Consultant

7. **A Member** queried about the practicability of assuming hybrid commercial vehicles movement such as taxi within urban area. **The Consultant** explained that the technology for hybrid taxi was already there but the practicality would be the key issue. He believed that when the hybrid taxi became commercially available, there would be a certain uptake rate. **The EPD** asked if double-deck hybrid buses would be suitable for Hong Kong because of the hilly terrain. **A Member** suggested the consultant to review the failure of using hybrid buses by the Toronto Transit Commission (TTC) in Canada. **A Member** commented that if the review of overseas experience suggested that hybrid bus was viable, it would then be a policy issue for the HK government to consider how to regulate the bus companies on hybrid bus uptake. He further stated that the government should consult the public on this issue. **The EPD** also asked the consultant to revisit whether the use of hybrid bus can still be regarded as short-term measure given the uncertainty of its effectiveness elsewhere. Consultant Consultant

8. **The EPD** invited members' views on the proposed control measures and commented that formulation of recommended control measures to achieve the desired objectives was an important role of the study. **A Member** reminded that the 75%

LNG case should be included as a medium term measure.

9. **A Member** commented that short term and medium term LNG measures were dependent on the government's policy. He also expressed his reservation on 100% LNG for security reason. **A Member** added that the 2% renewable energy target can be done in short term (i.e. by 2015) depending on government policy.

10. **A Member** opined that hybrid car might be taken over in 5 or 7 years time when more advanced rechargeable batteries for vehicles become readily available (like the plug-in hybrid). He doubted the use of hybrid bus as an emission reduction measure.

11. In response to EPD's query on cost figures being used in deriving the cost effectiveness for early retirement of aged and heavily polluting vehicles, **the Consultant** explained that he assumed replacement occurred naturally and the cost being the additional cost for the replacement.

12. In response EPD's query on the reason for not having Selective Catalytic Reduction on existing vessels, **the Consultant** explained that the SCR was not applied to old vessels because of space limitation.

13. **A Member** commented that many gaseous emissions would eventually turn into particulate and without accounting that part of secondary particulate formation the health benefit of PM reduction would be underestimated. **The Consultant** responded that the particulate formation from sulphate and nitrate would be included by using PM composition information to be provided by **a Member**.

14. Referring to the consultant's assumption on adopting on-shore power supply for all container terminals in HK, **a Member** commented that existing container terminals were inflexible to adopt on-shore support power supply because it would require huge amount of investment on the terminals. He opined that on-shore power supply could be considered for the

Action

future Container Terminal 10. **The EPD** commented that as international standards on on-shore power supply were being developed, the consultant would like to confirm if the indicative timeframe of 2010 was achievable. Consultant

15. **A Member** commented that the 2800 GWh of electricity saving due to mandatory building energy code mentioned by the consultant represented reduction in future growth but not actual reduction of existing energy usage.

16. **A Member** pointed out that the government had allocated a piece of land in the container terminal for port rail line which was now used for other purposes. He added that double handling would arise and only single deck containers could be carried in HK because double deck containers could not pass through the tunnels.

17. **A Member** suggested the consultant to elaborate more on VOC control options in order to meet the ozone target in the long run. He also stated that the consultant should prioritize all the control measures and identify the most effective and practicable ones. Consultant

18. **A Member** commented that it was not the scope of this study to assess whether certain control measures were feasible or not. He stated that representatives from THB should verify the assumptions in the model because the information would be useful in guiding the government's future policy. EPD / THB

19. **A Member** commented that the logic should be to first review the AQOs then develop the long term strategy. **A Member** echoed and commented that the government should set bold targets even though they could not be achieved. **A Member** further explained that by setting the objectives one would then know the current status of air quality and be able to identify the most critical pollutant by comparing with the standard being set. He added that this information will in turn

Action

affect the government's strategy.

20. Regarding the practicality of control measures, **a Member** commented that technical feasibility of control measures should be differentiated from government policy decisions and general public acceptance.

21. **A Member** had reservations on the implementation timeframe of some proposed measures such as reduction of car park and ERP. He also commented that it was necessary to go through public consultation on the possible implementation date of each control measure in order to classify them into long/medium/short term measures. **The EPD** agreed that the classification of the control measures could be revisited. Consultant

22. Regarding the effectiveness of energy saving measures in reducing air pollutant, **the EPD** stated that although the benefit might not be easily quantified, they would give indirect benefits and could be implemented more speedily when compared to other controversial control measures. **A Member** supplemented that by reducing electricity demand, the air pollutant emission would in turn go down.

Agenda Item 4: The way forward in formulating the Final Report

23. **The Consultant** gave a presentation on the proposed structure of the Final Report to facilitate discussion among panel members.

24. **A Member** opined that unlike most other countries, the rationale for setting current AQOs for HK had not been specific enough and there was no reference in the law about the protection of public health. Changing the wordings in APCO would give the legal backing for the action by the government. He also reiterated the importance of having a systematic review mechanism of AQOs and air strategy. **A Member** and another **Member** echoed that the AQOs should be developed for the protection of public health and that the standard should be

Action

regularly reviewed. **The EPD** explained that the term "public interest" included public health.

25. **A Member** commented that the new policy must be made acceptable to the general public, industry etc. and that the general public should be informed of the implications and limitations of the control measures.

26. In response to EPD's query on how the "acceptable risk" was determined in the context of WHO AQO guidelines, **a Member** explained that the absence of safe level applied to particulates and ozone only, and that the WHO interim targets represented a certain risk levels. Whether the risk level was acceptable would depend on the sophistication of the community and whether the community was willing to accept trade-off between health and economic benefits. He also explained that the reason for different jurisdiction having different standard could be that they were at different stage of their review cycle.

27. **A Member** stated that there should be only one set of AQOs for both ambient and roadside concentrations, with the roadside monitoring data being treated separately by devising advice to the public on what they should do in high roadside concentration situations. **A Member** commented that there should not be a more lax standard for roadside concentration. **The EPD** supplemented that long term exposure and transient exposure patterns were so different that the UK had disregarded the long averaging time standards (i.e. annual average) when checking compliance of roadside air quality. **The EPD** shared the concerns for roadside pollution and reminded the consultant to cover appropriate measures to tackle the problem in the final report. Consultant

28. **The EPD** sought consent from the members on firstly, no distinction between ambient and roadside standards, and secondly, whether and how roadside monitoring data was to be incorporated into the overall framework in assessing compliance with the proposed new AQOs. He supplemented that a separate

Action

study had been commissioned to review the current API system. Having said that, he considered that there must be good reasons for other countries not including roadside monitoring data in their compliance checking. He asked the consultants to take account of this important consideration when drawing up the recommendation. Consultant

29. **A Member** commented that with the large amount of population being exposed to roadside air pollution, the long term averaging data would still be useful when checking against compliance.

30. **The EPD** sought members' view on how to treat the ultimate guidelines recommended by WHO, bearing in mind that these were extremely difficult for Hong Kong to achieve over the short to medium term. **A Member** commented that the WHO AQGs should be adopted as the HKAQOs whereas the interim targets could be determined based on technical feasibility and economic factors. **The EPD** asked if a health based approach was equivalent to the adoption of the WHO AQGs, given that there was as yet no country in the world formally adopted the WHO AQGs as its own air quality standards. **A Member** explained that WHO had drawn information from all over the world including HK in formulating the AQGs. He opined that the WHO AQGs can be universally adopted and the reason why it had not been fully adopted by countries was due to legal and regulatory issues. **A Member** agreed with another **Member** that different countries were in different stages of their review cycle and suggested the consultant to look into the air quality standard review cycle of different countries to see if there was any convergence. Consultant

Action

31. **A Member** asked about the legal implication if Hong Kong adopted WHO ultimate guidelines as its own AQOs. **The EPD** explained that there were internationally two types of treatment on air quality standards, either limit values or guideline values. In Hong Kong the AQOs were featured under the Air Pollution Control Ordinance and belonged to the first type. He stated that the HKAQOs should be more than just an aspirational goal but a concrete plan that had to be complied with for achieving the objectives within a certain timeframe. **A Member** stated that it would be practical to have an aspirational goal as the target to be achieved, with interim targets as the statutory requirement.

32. Following discussion, **the EPD** summed up members' initial views on how best the review should be taken forward as follows: that a health based approach should be adopted in revising the HKAQOs; for setting out air quality standards in the law book, more manageable and realistic targets such as those interim targets suggested by WHO should be considered; a regular review system should be developed to update the AQOs; the number of exceedance allowed should be considered; same set of standards should apply to both ambient and roadside concentrations with the treatment of data from roadside stations to be further revisited; and the ultimate WHO AQGs should best be deemed as a long-term visionary or aspirational goal .

33. **The EPD** asked the consultant to fine tune their recommendations for discussion in the next meeting. Consultant

34. Referring to a Member's request, **the EPD** asked when the modeling results assuming implementation of all proposed measures would be ready. **The Consultant** responded that the results were targeted to be ready by the end of July 2008 and would be presented in the next meeting. Consultant

35. **A Member** commented that the presentation material should be passed to panel members at least two days in advance. **A Member** asked for the detailed assumptions of the analysis.

Action

36. **A Member** asked whether the Guangdong Government was conducting a similar review. **A Member** stated that the Guangdong Government had invited a group of experts to a conference and some experts had recommended the government to adopt a more stringent or even the WHO AQGs.

Agenda Item 4: Any Other Business

37. There being no other business, the meeting was adjourned at 6:00 p.m. The next meeting would be held in August 2008 and the date to be confirmed nearer the meeting.

Minutes of the Fifth Advisory Panel Meeting of the Review of Air Quality Objectives and Development of a Long Term Air Quality Strategy Held on 14 November 2008 at 2:30 p.m.

Present

Ms. Anissa Wong	(Chairperson / EPD)
Mr. Carlson K.S. Chan	(EPD)
Mr. W.C. Mok	(EPD)
Mr. Pang Sik-wing	(EPD)
Ms. Susanna Lai	(EPD)
Mr. Benson Yeung	(EPD)
Mr. C. H. Kan	(EPD)
Ms. Alice Tang	(EPD)
Professor Frank Lee	(HKPU)
Professor Wong Tze-wai	(CUHK)
Professor Alexis Lau	(HKUST)
Dr. Ng Cho-nam	(HKU)
Mr. Harry Lai	(ENB)
Mr. Willy Tsoi	(FHB)
Mr. C. T. Wong	(THB)
Mr. Joseph Wong Pang-sui	(CPU)
Mr. Timothy Peirson-Smith	(Executive Counsel Ltd)
Dr. Alfred Tam	(Hong Kong Asthma Society)
Mr. S. H. Chan	(CLP Power)
Mr. C. T. Wan	(HKE)
Mr. Alan Lee	(HKCTOA)
Mr. Aaron Ng	(Tai Wo Motors Ltd)
Dr. Chow Kit-bing	(DC)
Mr. Leung Siu-tong	(DC)
Mr. Alan Kwok	(Arup)
Mr. Sam Tsoi	(Arup)
Dr. Kin Lo	(Arup)
Mr. Paul Kent	(Arup)
Ms. Dorothy Lam	(Secretary / Arup)

Absent with Apologies

Mr. Kim O Chan	(HKIP)
Miss YUEN Wai Yin, Amy	(Planning & Lands Branch, DB)
Mr. Kenneth Chan	(GHKFAL)
Mr. James Graham	(ex-JEC)

Action

1. **The Chairperson** welcomed all members to the fifth meeting of the Advisory Panel on the Review of Air Quality Objectives (AQOs) and Development of a Long Term Air Quality Strategy.

Agenda Item 1: Confirmation of Minutes of the Last Meeting

2. Referring to paragraph 32 of the minutes of last meeting, **a Member** said that **EPD's** summary of discussion represented the views of only some members and should not be taken as the consensus of all members present. Also, he suggested reviewing later in the meeting the phrase 'manageable and realistic targets' as this was not agreeable to all of the members.

3. Referring to paragraph 24 of the minutes of last meeting, **a Member** said that some members suggested 'protection of public health' should be explicitly stated in the law.

Agenda Item 2 : Matters Arising

4. Referring to paragraph 3 of the minutes of the last meeting, **EPD** reported that the consultants agreed to include in the final report the uncertainty of regression analysis for estimating roadside air quality.

5. Referring to paragraph 4 of the minutes of last meeting, **EPD** reported that the minutes of the two sub-group meetings had already been circulated to members.

Action

6. Referring to paragraph 6 of the minutes of last meeting, **EPD** reported that the consultant would provide individual cost/benefit figures for the proposed control measures in the final report.

7. Referring to paragraph 7 of the minutes of last meeting about overseas experience in use of hybrid buses, **the Consultant** reported that London Transport Department planned to add 40 double-decker hybrid buses this year and would gradually increase this number with an aim to have every bus purchased to be a hybrid by the time of the 2012 London Olympics. He further explained the failure of hybrid bus usage in Toronto was due to the short working life of the lead acid batteries used. The use of hybrid buses would still be recommended as a short-term control measure.

8. Referring to paragraph 14 of the minutes of last meeting regarding the adoption of on-shore power supply for all container terminals in Hong Kong as a medium-term measure, **the Consultant** reported that on-shore power was commissioned in the port of Los Angeles in 2004. According to the Green Port Annual Report 2005, the port of Long Beach in the US had also initiated a master plan for on-shore power. He also mentioned that Nippon Yusen Kabushiki Kaisha in Japan had built the world's first container vessel to support shore-side power electrification.

9. Referring to paragraph 17 of the minutes of last meeting, **the Consultant** reported that other potential VOC control measures such as further control in evaporative loss from vehicles, replacing highly reactive VOC species with low reactivity ones in industrial solvent and consumer products would be further elaborated. Moreover, the emission reduction potential, implementation cost, benefit, and benefit/cost ratio for each of the proposed measures had been calculated for inclusion in the final study.

Action

10. Referring to paragraph 21 of the minutes of last meeting regarding the timeframe for implementation of the control measures, **the Consultant** mentioned that some measures such as Electronic Road Pricing would require other supporting facilities or infrastructure (e.g. alternative routes with adequate capacity for motorists to bypass the charging zone). For reduction of car parking space, it would take time to change the planning guidelines and to lobby the concerned building owners. These measures would therefore be treated as medium-term.

11. Referring to paragraph 30 of the minutes of last meeting, **the Consultant** confirmed the development cycle of air quality standards of other countries showed a generally decreasing but convergent trend.

Agenda Items 3 and 4 : Briefing on the principles for setting the revised AQOs and the consultants' proposal on the new AQOs *AND* Comment and Discussion

Presentation on the Broad Principles and the Proposed New AQOs [slides # 1- 16]

12. **The Consultant** made a presentation on the principles and proposal of the revised AQOs.

13. Referring to slide #14, **a Member** disagreed that the proposed AQOs had to be achievable in the near term, and questioned why 'health' was not included in the slide as was the case in bullet 1 of slide #4. **The Consultant** explained that 'health' was interpreted as health risk. He said that the WHO interim or ultimate standards were associated with health risk. There was actually a risk percentage associated with the concentrations proposed in the WHO standards.

14. **The EPD** summed up the consultant's presentation on the guiding principles promulgated by the WHO for the setting of AQOs, analysis of Hong Kong's current air quality situation and comparison of our existing AQOs to the WHO IT-1 and the longer term objectives. **The EPD** sought members' comments

on the proposed new AQOs and the way forward of this study, taking into account the gap between the WHO Air Quality Guidelines (AQGs) and our current air quality, the status of AQOs as legal standards under APCO and the prevailing situation that so far no economy had adopted fully the WHO AQGs as their legal standards.

15. Referring to bullet 2 in slide #4, **a Member** opined that WHO IT-1 were generally used for less developed economies and should not be applied to a developed city like Hong Kong.

16. Referring to bullet 1 in slide #5, **a Member** commented that the level of development was one of the considerations that would affect the variability of standards set for different countries. For slide #4, he could not agree on the broad principle of 'manageable and realistic targets' as this would not be able to adequately protect public health.

17. **A Member** reiterated that the principle for setting AQOs was to protect public health. He quoted the US Air Quality Standards were determined by making reference to certain concentration levels that were protective to public health and not causing any health damage. He added that scientific evidence had proved there was no threshold value for many of the pollutants below which there was no adverse health effect. He thus emphasized the need to minimize the impact on public health which should be adopted as the principle for setting the AQOs.

18. Referring to bullets 2 and 4 in slide #4, **a Member** disagreed that a standard set for protection of public health would have to be manageable and realistic. Whether a standard was manageable would depend on the control strategy to be implemented. In addition, any number of exceedance should not be allowed in the revised AQOs.

19. Referring bullet 6 of slide #4, **a Member** stated that the WHO AQGs were derived based on scientific evidence and they

should be the lowest level showing some adverse health effects. He further stated that the time to achieve the AQGs would depend on how serious the community treated the standards.

20. In response to these comments, **the EPD** emphasized the Administration adopted a forward-looking attitude in reviewing the AQOs. She pointed out that the proposed new AQOs as recommended by the consultants were of more stringent than the current AQOs and showed a major step forward. The intention was to go ahead in the right direction and with progressive improvement over time through the establishment of a regular review mechanism. She considered the issue in front of members were whether it was appropriate to have interim targets, bearing in mind that WHO did recognize the case for individual countries to adopt interim targets taking account of their own circumstances and that the WHO AQGs were so far not adopted by any economies, including those developed economies, as their legal air quality standards.

21. **A Member** echoed another **Member's** view that protection of public health should be the principle for setting the AQOs. If interim targets were accepted at this stage, the government should state explicitly what would be the ultimate air quality guidelines and when and how to achieve them.

22. **A Member** further commented that WHO IT-1 could not be taken as an improvement over our existing AQOs as the annual PM10 standard advocated therein was less stringent, i.e. 70 ug/m3 vs. our current standard at 55. Adoption of this less stringent standard would convey the message to the public that there would be no improvement in the new revised AQOs.

23. **A Member** commented that the WHO AQGs were the ideal standards while the health risks associated with air pollution kept changing in the past 20 years. He said this would be a case of ideal targets vs. realistic and enforceable targets. He opined the proposed standards should be realistic and enforceable and come together with suitable control policies to

achieve them.

24. **The EPD** invited members to share their understanding of the extent of health risks under the various interim targets and the AQGs.

25. In response, **a Member** said that WHO AQGs were not theoretical but based on solid findings of a number of health studies. Many jurisdictions aimed to follow the AQGs for the best interest of their citizens while others would include a review mechanism to warrant regular update of their air quality standards. He emphasized that the whole purpose of AQOs was to protect public health and questioned the Administration the meaning of practicability and the envisaged problem if more stringent standards were adopted.

26. **A Member** expected there would be similar debate in the future public consultation on the revised AQOs. It would be necessary to explain to the public the practical difficulties such as reduction in the number of our running vehicles, any impact on our economic activities, etc. should the WHO AQGs be adopted as the legal standard. Any insurmountable difficulties such as cross-boundary air pollution should also be highlighted to the public. In the end, progressive improvement by meeting the interim targets in stages could be the only choice.

27. On the request of the Chairperson, **the EPD** read to the meeting a quote from the WHO Report 2005 that '*Countries can move towards these guidelines gradually by adopting the interim targets proposed as they begin to reduce ambient air pollution. The interim targets are intended as incremental steps in a progressive reduction of air pollution in more polluted areas; they are intended to promote a shift from concentrations involving acute, serious health consequences to concentrations that, if achieved, would result in significant reductions in the risk of acute and chronic effects. Such progress towards guideline values should be the objective of air quality management and health risk reduction in all areas.*".

The EPD added that the interim targets were health based and meant for protection of public health. WHO did not make any distinction between developed and developing countries in designing these interim targets.

28. On the request of **the EPD** to explain the use of Tap Mun's air quality data in slide #10 to assess the regional influence, the **Consultant** summed up that Hong Kong was a developed economy surrounded by the rapidly developing economy of the Pearl River Delta Region. The exceedances observed at Tap Mun background station in 2007 were mostly caused by regional pollution and thus, it would be difficult for Hong Kong to meet even the interim targets without overall reduction in emissions in the Region.

29. **A Member** suggested to clearly spell out that an interim target was being proposed for now but with an aim and time table to achieve the ultimate target. Concerning slide #15, he commented on the percent improvement of the revised AQOs compared to the existing standards set some 20 years ago was not significant and particularly so for important pollutant as particulate matter.

30. **A Member** supported another **Member's** comments. He highlighted the importance to explain to the public that major developments could still proceed despite non-attainment of the current air quality compared to the AQGs. However, the development proponents should adopt the best available technology to offset and/or control any new emissions to help meet the AQG requirement.

31. **A Member** said that although PM2.5 was included in the proposed AQOs, there was no mention of other pollutants such as benzene, B(a)P, dioxins and other carcinogenic compounds. He suggested that other pollutants such as lead which had minimal association with our industry and vehicles should be removed from the proposed list while PM10 should go for a more stringent standard such as IT-2. **A Member** further commented

that it might be difficult for the public to understand the reason for adopting different targets and averaging time for the same pollutant such as sulphur dioxide.

***[Post meeting note**: As pointed out in the Study Review Report, EPD's study "Assessment of Toxic Air Pollutant Measurements in HK" has confirmed the ambient levels of carcinogenic compounds other than $PM_{2.5}$ were relatively low.]*

32. **A Member** suggested using percentage of time as the unit of exceedance in comparing our air quality to IT1, IT2, IT3 and AQGs. **A Member** added it could be the percentage of hours or measurements of exceedance in a year. In response, **the EPD** said that the approach proposed by the Consultant on expression of exceedances was reasonable and consistent with international practices to allow comparison with overseas air quality data.

33. Referring to bullet 4 of slide #4, **a Member** disagreed to have exceedances in the proposed new AQOs. **A Member** pointed out that EU did allow exceedances and **the EPD** supplemented that EU had the most stringent AQOs but still had not fully adopted the WHO AQGs nor prohibited exceedances, e.g. EU's AQGs allowed 3 exceedances for SO2 which was still at the IT-1 standard. **A Member** reiterated his view that AQO should be set to protect public health and not be dictated by the allowed number of exceedance.

34. **A Member** further suggested adopting the AQGs as the highest standards and using the interim targets as performance indicators to gauge how well Hong Kong was doing in improving the air quality. **A Member** expressed concern about the approach to adopt the highest standards and with a large number of exceedances allowed. He suggested adopting an interim target to minimize or even avoid exceedances.

35. **The EPD** recalled the discussion with the Consultant in the 2nd Advisory Panel Meeting that UK had put in place a regular review system to update their legal air quality standards.

She further elaborated that AQOs were legal standards under Air Pollution Control Ordinance (APCO) and they carried major legal implications. Once the legal standards were agreed upon, the Government would have the responsibility under the Air Pollution Control Ordinance (APCO) (Cap 311) to introduce policies to achieve the relevant AQOs as soon as practicable. In addition, granting approval to "specified processes" such as electricity works under the APCO or evaluating the air quality impact of designated projects under the Environmental Impact Assessment Ordinance (EIAO) (Cap 499) has to be determined with reference to the AOQs. Practicability therefore had to be taken into account before accepting any revisions to the AQOs as legal standards. Even both UK and EU did not adopt the AQGs as their legal standards. Rather, progressive interim targets with regular review and implementation timeframe seemed a more appropriate way forward for Hong Kong.

36. **A Member** pointed out that there were conditional exemptions granted for essential projects in some non-attainment areas in the US. The project proponents would need to adopt best available technologies to control and/or offset new emissions. He also explained that although some countries did not adopt the AQGs as their statutory guidelines, they would have a process to review the appropriateness in applying the AQGs.

37. Referring to Tap Mun air quality situation as described in slide #10, **a Member** echoed another **Member's** comment that regional collaboration was important. He pointed out that Tap Mun's air quality had deteriorated due to emissions from the neighboring container terminal in Yiantian.

38. **A Member** asked members for a consensus that a detailed roadmap, with the interim targets clearly spelt out, should be set for the new proposed AQOs. Periodical review should also be made to achieve the AQGs by a target year. In addition, he suggested the Government to liaise with Guangdong as soon as possible on regional collaborations as the Guangdong EPD was

now formulating the 12th 5-year Plan.

39. **A Member** supported another **Member's** suggestion. He considered that interim targets should be adopted if the most stringent standards could not be achieved now and in that case, a good explanation as well as the way forward to achieve the most stringent standards should be given to the public.

40. **A Member** supported the broad approach to adopt targets that were achievable, manageable and realistic. He also asked for the timeline for reviewing the AQOs in the future.

41. **A Member** considered the Government should aim for more stringent standards as the proposed interim targets were too conservative. In addition, she asked how the proposed standards would compare to that in Singapore, Taiwan and Korea. **The Consultant** responded that Singapore and Taiwan were adopting the US standards. **A Member** added that Thailand, Vietnam and Bangladesh were adopting tighter standards than IT-1. **A Member** asked which other countries had adopted WHO IT-1.

42. **A Member** opined the public was concerned about the lapse of some 20+ years since the last review of our AQOs and suggested to specify in the law for a mandatory review every three to five years. **A Member** supplemented that there was a review initiated by EPD in 1996 but it was stopped for unknown reason in 1997.

43. **The EPD** summarized the two schools of thought according to members' comments: the first being to adopt AQGs with a large number of exceedance/exemption in the knowing they would be difficult to be achieved in Hong Kong; the second being to adopt AQGs as the long-term goal to be achieved progressively via health-based interim targets that were subjected to regular reviews. The latter approach would project a momentum of continuous improvement in our air quality. **A Member** commented that the proposed standards should not

only be health-based but should be for the protection of public health. **A Member** suggested the two schools of thought could actually be one as the only difference was the commitment of the Government. He suggested the Government should clearly spell out her determination in the protection of public health. He further suggested the two most important pollutants, i.e. PM2.5 and PM10, should show significant improvement in the revised AQOs. **The EPD** responded that the consultants would consider how best the proposed interim targets would be revised taking into account members' comments**. The EPD** added that other air toxins (e.g. benzene, PAHs and other carcinogenic compounds) as mentioned by **a Member** would be reduced accordingly if the revised AQOs were attained.

44. **A Member** registered his objection to allow a number of exceedance in the new AQOs as it would only relax the standard. **The Consultant** responded that most of the exceedances were mainly due to regional emission sources and the proposed limit on the number of exceedance was based on statistical principles. **A Member** further commented that the limit on the number of exceedance could theoretically be adjusted to cater for possible deterioration of air quality when statistical principles were applied.

Presentation on the Proposed Control Measures [slides #17 -35]

45. **The Consultant** continued the presentation on control measures and emphasized that the estimated emission reductions and cost/benefit analyses for the proposed control measures were subjected to uncertainties from assumptions that had to be made for measures to be implemented many years away, in 2015 to 2030.

46. **A Member** commented on item 15 of slide #29 that the energy saving for the mandatory building energy codes should be 0.7% instead of 10-15%, based on information he gathered from another source. **The EPD** explained that the figures presented in

the slide, which were sourced from EMSD, referred to the potential savings from those new buildings which were to be designed according to the building energy codes. The suggested savings should be in good order.

47. **The EPD** pointed out that the estimated emission reduction and benefit/cost ratio for each of the proposed measures should be viewed and assessed in their own right. For example, emission reduction for control measures at the roadside would be low but the benefits rather substantial. **The Consultant** added that tailpipe emission form vehicles would have more direct impact and affect more people while emission from stacks of stationary sources would be better dispersed thus affecting fewer people. This would explain the differences in the estimated benefits of traffic-related and other control measures.

48. **A Member** pointed out that policy decision should not be based solely on the cost/benefit analysis results as there were always many other hidden costs and benefits. The cost/benefit analysis results should only be taken as providing additional information for policy formulation.

49. Referring to slide #30, **a Member** cautioned that the contribution of Hong Kong to the total RSP emission in the Pearl River Delta Region would be relatively low but from the angle of the local receptors/airborne RSP concentrations, the contribution of Hong Kong would be significant.

50. In response to a question of **a Member** on the typical level of uncertainty for the analysis results, **the Consultant** said the risk factor for chronic health impact would range between two to 11% for each 10 ug/m^3 change in PM2.5 concentration. **The Consultant** added said that a good estimate would be about 50% for some of the assumptions adopted.

Action

51. Referring to the increased ratio of LNG power to 50% by 2015 in slide #24, **a Member** queried about the quoted emission reduction potential and cost/benefit analysis results. He said power company would need to work closely with the Consultant and EPD to make sure the figures would be in the right order of magnitude. **Consultant/ Member/ EPD**

***[Post Meeting Note**: A meeting among power company, the Consultant and EPD was held on 3 Dec 2008 (Wednesday) to go through the calculations.]*

52. **A Member** questioned how the benefit/cost ratio for the various control measures would be used. He believed the public would like to have all the control measures implemented for protection of public health and therefore, it would be necessary to highlight to the public that the costs would eventually be borne by the whole community. He asked if the consultant would prioritize the proposed control measures before announcing them to the public.

53. **A Member** commented that consensus on the proposed control measures should be sought from the relevant bureaux as these measures would probably need to go through some legislative processes before implementation. He also highlighted the need to explain the control measures in layman language to the public.

54. **A Member** said he simply did not have enough time to review the proposal and thus he had reservation to just accept the materials presented at the meeting.

55. Referring to **a Member's** comment about prioritizing the control measures based on the benefit/cost ratio, **the EPD** pointed out that for some measures the ratio might seem to be low but the absolute emission reduction potential was in fact rather substantial. It would therefore be very difficult for the consultants to devise credible criteria to prioritize the control measures. This issue was discussed by the working subgroups

before and the decision was to put the measures into different groups for implementation by phases instead of prioritizing them. In fact, the analysis by the consultant showed that the proposed new AQOs could be achieved only marginally and with allowed exceedances, after implementation of ALL the short-term measures. **The EPD** supplemented that the grouping of the measures into different phases had taken into account the technological feasibility, social and economic costs, etc. She emphasized the figures presented would have a certain margin of error as the consultant simply could not go into detailed analysis under the scope of the current study. She added that the figures would be subject to further refinement and invited members to offer comment if they spotted any inaccurate assumptions.

Presentation on Projected Air Quality, etc. [slides #36 – 52]

56. **The Consultant** continued the presentation on the projected air quality, exceedances to be allowed, and how the proposed new AQOs compared to other countries.

57. **A Member** suggested and another **Member** echoed that standards more stringent than IT-1 should be adopted for PM2.5 and PM10. **The EPD** pointed out that the proposed control measures were a menu of actions and one should bear in mind that not all of the proposed measures could be fully implemented by 2015 to achieve the projected air quality. Some margin should thus be allowed in setting the new AQOs.

58. **A Member** suggested the consultant to define 'exceedance' carefully – whether it should be per site or for all monitoring sites. Also, the number of exceedance for PM2.5 at the roadside would probably be much higher than seven times as proposed. He reiterated his previous comment that the number of exceedance should be expressed in percentage of measurements or hours because monitoring work would unlikely take place for 365 days a year [taking into account equipment

Consultant

downtime and repair].

59. **A Member** doubted the rigidity of the proposed number of exceedance and further echoed another **Member's** comment that more stringent standards for PM2.5 and PM10 should be set but with a large number of allowed exceedance. He questioned about the significance of having a higher number of exceedances than allowed as this was what had been happening in Hong Kong all these years.

60. **A Member** also expressed his support to another **Member's** suggestion to have more stringent standards for particulate matters. Referring to slides #39 and 40 on PM10 projections, **a Member** considered that the Government could do more in order to achieve standards tighter than IT-1. He said that some control measures such as Electronic Road Pricing (ERP), reduction in parking provision, etc. were not restrained by technological feasibility and could be advanced from medium- to short-term. He then referred to a public consultation by the Council for Sustainable Development that showed the public's support to implement ERP at the earliest day possible. In response, **a Member** explained that ERP was deemed a medium-term measure because the construction of Central/Wanchai Bypass as an alternative route would not be completed before 2015. **A Member** countered that Central/Wanchai Bypass should not be considered as the only alternative route for the ERP system. Alternative route should not be restricted to a physical road but should include other choices such as public transport. **The EPD** pointed out the environmental benefits of ERP was unlikely to be significant because the targeted private cars accounted for only about 1% PM10 and 5% NOx of the total vehicular emissions in Hong Kong.

61. Referring to slide #15, **a Member** commented that the proposed IT-1 standard for PM10 would yield very little improvement in health risk when compared to the corresponding standard in the existing AQOs. He reiterated his support to

Action

another **Member's** suggestion to have more stringent standards for particulate matters.

Presentation on Other Issues and Way Forward for Study [slides #53 – 62]

62. **The Consultant** continued the presentation on other issues to be considered and the way forward.

63. **A Member** expressed his strong view for amendment of the Air Pollution Control Ordinance to state explicitly that the AQOs were set for the protection of public health. He considered the 'inflexibility' in putting that in the legislation would in fact be an advantage to show the Government's commitment to improving the air quality.

64. Concerning the next consultation forum, **a Member** suggested the timing of the forum should avoid clashing the Lunar New Year period. He then reiterated that percentage of time rather than number of incident should be used for counting the allowed exceedances. In response, **the EPD** invited the consultant to review the practices in other countries and report back to the meeting. **Consultant**

65. **The EPD** noted some members' views that in amending the AQOs the consideration of protection of public health should be explicitly spelled out. . She said under the current APCO, the objectives of the legislation had set out that the AQOs were determined for 'public interest' , and it would not be in the public interest if the consideration of protection of public health was not taken into account.. She went on to explain that if it were decided that the principle of protection of public health had to be stated explicitly, there was a need to deliberate whether this should be achieved by amending the principal legislation or incorporating the principle in the Technical Memorandum on the AQOs. The legislative process to amend the APCO and to issue the Technical Memorandum would be different, as the former route would involve more lengthy process. **EPD**

Action

66. **A Member** said that the US legislation specifically excluded consideration of economic and technological feasibility in setting their standards, for protection of those who were more susceptible and those who were chronically ill. **The EPD** supplemented that there were secondary ambient standards in the US to cover welfare and other non-health issues. He suggested the Technical Memorandum to be issued under the APCO for our revised AQOs would state explicitly that the new objectives were for protection of public health. **A Member** added that it would be even better to have two objectives - one for health and one for other non-health issues, stated explicitly in the legislation to show the Government's commitment towards air pollution control. **A Member** added that the term 'public interest' in the existing APCO would diffuse the commitment of the Government to protect the health of the public.

*[**Post meeting note**: As shown in the Appendix 1, there is a great variety of wordings adopted by developed economies in expressing the purpose of the AQOs. Stating the objective as protection of public health in the Technical Memorandum is similar to the practice of Australia.]*

Agenda Item 5: Discuss the way forward and the approach of putting forth the proposed new AQOs and control measures for public consultation

67. **A Member** asked three questions. First, the schedule for holding the next Advisory Panel meeting. Second, whether Panel members would have a chance to comment on the consultation document before release. Third, what would be the role of Panel members during the period of public consultation. **The EPD** clarified that the next public forum would tentatively be held in January 2009 to gauge the response of the public on the preliminary findings for inclusion in the draft Final Report. After acceptance by the Government of the Final Report, a full scale public consultation on the proposed

AQOs and the long-term air quality management strategy would be conducted by the middle of 2009.

68. **A Member** opined that even though the government would take no firm position on the proposed AQOs and control measures at the public forum, the public might perceive the proposed AQOs and control measures presented at the forum were preferred by the Government. He said the next public forum would need to be adequately prepared to take on challenges and heated debate. He thus suggested having one more Panel meeting to forge a general consensus among the members. **The EPD** reiterated that the principles for setting the new AQOs should be forward-looking, progressive, and to aspire to achieve the AQGs in phases benchmarked by interim milestones. On the issue of 'protection of public health', she asked the consultant to draw reference from legislations in the US, UK and other advanced countries, for further review by members. She suggested to hold another Panel meeting tentatively in December. The exact date would be confirmed nearer the time.

Consultant

69. **The Consultant** invited comments from members regarding the proposed control measures within one week after the meeting. In response to a request for more information on the proposed AQOs and control measures, **the Consultant** agreed to organize a workshop to explain the assumptions, methodology, range of uncertainty and the cost/benefit analysis results to members on 18 November 2008. **A Member** said he liked to register his objection against adopting WHO IT-1 as our new AQOs.

Consultant

***[Post Meeting Note**: The workshop was held on 25 Nov 2008 (Tuesday) and attended by three Advisory Panel members.]*

70. **A Member** raised the issue of the review mechanism and asked if the Panel was required to make a decision. **The EPD** asked for the views of members but opined that whether the

Action

review mechanism was effected by amendment of the APCO or by issuance of a Technical Memorandum under the Ordinance would show the same level of commitment of the Government – though amendment of the APCO would be a lengthy process. **A Member** suggested further discussion at the next meeting.

Agenda Item 6: Any Other Business

71. There being no other business, the meeting was adjourned at 6:10 p.m. The next meeting would tentatively be held in the second week of December 2008.

Appendix 1: Description of the Purposes of AQOs:

1. USA:

(Ref: USA's Clean Air Act)

(a) National primary ambient air quality standards:

Ambient air quality standards the attainment and maintenance of which in the judgment of the Administrator, based on such criteria and allowing an adequate margin of safety, are requisite to protect the public health.

(b) National secondary ambient air quality standards

A level of air quality the attainment and maintenance of which in the judgment of the Administrator, based on such criteria, is requisite to protect public welfare from any known or anticipated adverse effects associated with the presence of such air pollutant in the ambient air.

Please also note the one of the purposes of the Clean Air Act which provides the promulgation of these air quality standards is "to protect and enhance the quality of the Nation's air resources so as to promote the public health and welfare and the productive capacity of its population".

2. EU:

(Ref: EU's Council Directive 96/62/EC of 27 September 1996)

'Limit value` shall mean a level fixed on the basis of scientific knowledge, with the aim of avoiding, preventing or reducing harmful effects on human health and/or the environment as a whole, to be attained within a given period and not to be exceeded once attained;

3. New Zealand:

(Ref: New Zealand's Resources Management Act)

National environmental standard means a standard prescribed by regulations made under section 43 (of the Resources Management Act).

The purpose of the Resources Management Act, which provides the setting of the ambient air quality standards is "to promote the sustainable management of natural and physical resources". And, "**sustainable management"** means managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural wellbeing and for their health and safety while—

(a) Sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and

(b) Safeguarding the life supporting capacity of air, water, soil, and ecosystems; and

(c) Avoiding, remedying, or mitigating any adverse effects of activities on the environment.

4. Australia:

(Ref: Australian National Environment Protection Council Act 1994 and National Environment Protection (Ambient Air Quality) Measure)

National environment protection measure means a measure made under subsection 14(1) (of the National Environment Protection Council Act 1994)

Under the Schedule 4 to the Act on National Environment Protection Measure, the general purpose of the measures is stated as follows:

The Commonwealth and the States acknowledge that there is benefit to the people of Australia in establishing national environment protection standards, guidelines, goals and associated protocols (hereinafter referred to as *"measures"*) with the objectives of ensuring:

(i) that people enjoy the benefit of equivalent protection from air, water and soil pollution and from noise, wherever they live;

(ii) that decisions by business are not distorted and markets are not fragmented by variations between jurisdictions in relation to the adoption or implementation of major environment protection measures.

Any proposed measures must be examined to identify economic and social impacts and to ensure simplicity, efficiency and effectiveness in administration.

Under the "National Environment Protection (Ambient Air Quality) Measure", it is stated that: "The desired environmental outcome of this Measure is ambient air quality that allows for the adequate protection of human health and well-being."

5. UK:

(Ref: The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, Volume 1 – July 2007)

The UK Government's and devolved administrations' primary objective is to ensure that all citizen should have access to outdoor air without significant risk to their health, where this is economically & technically feasible.