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Panel on Environmental Affairs

Special meeting on 29 July 2009

Background brief on review of Air Quality Objectives

Purpose

This paper sets out the progress of the review of Air Quality Objectives (AQOs), and gives a brief account of the views and concerns expressed by the Subcommittee on Improving Air Quality (the Subcommittee) formed under the Panel on Environmental Affairs (the Panel).

Introduction

2. In Hong Kong, the legal AQOs are set out in the Technical Memorandum of the Air Pollution Control Ordinance (Cap. 311) (APCO). AQOs stipulate appropriate concentration targets for selected air pollutants and these standards serve as the references for the authority in deciding on emission permitted for specified process licences granted under APCO and in assessing whether the air quality impacts of designated projects are acceptable for approval under the Environmental Impact Assessment Ordinance (Cap. 499). AQOs are also the references adopted in determining Air Pollution Index. The current AQOs were established in 1987 and cover seven major air pollutants. The current AQOs and achievement status as in November 2006 are in the **Appendix**.

Review of AQOs

3. In October 2006, the World Health Organization (WHO) released a new set of Air Quality Guidelines (AQGs), which provide a scientific basis for supporting the development of air quality policies and management strategies in various parts of the world to protect human health. Owing to the stringency of the new AQGs, WHO has recommended interim targets in the new guidelines for countries to improve their air quality progressively. The actual air quality standards set in each country will vary according to the approach adopted for balancing health risks, technological feasibility,

economic considerations as well as various other political and social factors. WHO also advises that governments should consider their own local circumstances carefully before adopting the new AQGs as statutory standards.

4. Since the new WHO AQGs are much more stringent than the current AQOs, achieving the new WHO AQGs in Hong Kong will require drastic measures to be taken not only in Hong Kong, but also the Pearl River Delta Region which has great influence on the pollution in Hong Kong. To draw up a new set of AQOs for Hong Kong and devise a long-term plan for meeting such new AQOs, the Administration needs not only detailed information on required specified measures, their implications and available options, but also full public participation. In this connection, the Administration has commissioned a consultancy study in 2007 for completion by the third quarter of 2008 to recommend a new set of AQOs for Hong Kong and an air quality management strategy to achieve the new AQOs. An Advisory Panel comprising members from various disciplines, including health, air science, industry and transport trades, as well as representatives of relevant Government bureaux and departments, has been formed to steer the Review. Upon completion of the study, a public engagement process will be conducted to finalize the new AQOs and the required long-term strategy on air quality management within 2009.

Preliminary findings of the Review

5. Guided by WHO AQGs and their interim targets and taking into account local circumstances, the consultant recommends that a progressive, forwarding-looking approach should be adopted in determining the new AQOs as follows –

Pollutants	Averaging Time	Existing AQOs		Proposed AQOs [*]							
		($\mu\text{g}/\text{m}^3$)	#	IT-1		IT-2		IT-3		AQG	
		($\mu\text{g}/\text{m}^3$)	#	($\mu\text{g}/\text{m}^3$)	#	($\mu\text{g}/\text{m}^3$)	#	($\mu\text{g}/\text{m}^3$)	#	($\mu\text{g}/\text{m}^3$)	#
Sulphur dioxide	10-min	-		-						500	3
	24-hour	350	1	125	3	50		-		20	
Respirable Suspended Particulates (PM10)	24-hour	180	1	150		100	9	75		50	
	1-year	55	0	70		50	0	30		20	
Fine Suspended Particulates (PM2.5)	24-hour	-		75	9	50		37.5		25	
	1-year	-		35	0	25		15		10	
Nitrogen dioxide	1-hour	300	3	-						200	18
	1-year	80	0	-						40	0
Ozone	8-hour	240 ^[1]	3	160	9	-			100		

Carbon Monoxide	15-min	-			100,000	
	30-min	-			60,000	
	1-hour	30,000	3	-	30,000	0
	8-hour	10,000	1	-	10,000	0
Lead	1-year	1.5 ^[2]	0	-	0.5	0

[*] The proposed AQOs are presented in bold faces with greyish background.

[#] Number of exceedances to be allowed:

Any exceedance measured at the general air quality monitoring station(s) at any one time would be counted as one exceedance against the number allowed for a calendar year. The number of exceedances is recommended with reference to the current practices overseas as well as to the predicted air quality situation of Hong Kong after full implementation of the Phase I measures.

[1] There is no existing 8-hour AQO for ozone in Hong Kong. The figure presented above is the 1-hour AQO.

[2] There is no annual AQO for lead in Hong Kong. The figure presented above is the 3-month AQO

6. To achieve the new AQOs, the consultant has preliminarily identified a host of comprehensive emission reduction measures which the Government may consider implementing to improve air quality. These measures mainly target at the following areas –

- (a) cutting emissions from power plants by increasing the proportion of natural gas in the fuel mix for local electricity generation from the current 28% to say 50% or more;
- (b) advancing the earlier replacement of more polluting vehicles, including franchised buses, and promoting the use of more environment-friendly vehicles;
- (c) further tightening the control of emissions from vessels and other sources;
- (d) introducing suitable traffic management measures, such as low emission zones etc, to reduce roadside emissions;
- (e) expanding rail/tram network; and
- (f) promoting energy efficiency.

The conceptual outline of these measures together with a broad assessment on their emission reduction potential and a cost-benefit analysis are given in Appendix II to LC Paper No. CB(1) 1057/08-09(01) which is hyperlinked below for ease of reference. On the assumption that the Guangdong side will continue to reduce emissions from its power, transport and industrial sectors in tandem with its economic growth, it is anticipated that the new AQOs can be achieved with the full implementation of the Phase I control measures, subject to suitable allowance for exceedance.

Implementation of the Phases II and III measures will further reduce local emissions and help to achieve the next higher targets under WHO AQGs where applicable.

7. According to the Administration, some of the improvement measures would have significant cost/tariff implications. For instance, raising the current share of natural gas of domestic electricity generation to 50% or more could increase tariff by phases to at least 20% from the current level, given the need to install additional gas-fired generators and other emission reduction measures and the fact that natural gas is significantly more expensive than coal. The control measures affecting the transport sector may likewise carry tariff implications due to an increase in the capital expenditure and operation costs of the transport trades. For example, depending on the scale of the exercise, advancing the replacement of franchised buses could drive the fare increase pressure to about 15% in a single year. This will be on top of fare increases due to factors such as higher operating costs. There are also questions of how to fund the early replacement of nearly 3 000 buses, and the impact on franchised bus companies' financial accounts and operations. Furthermore, some measures may require legislation and impose significant resource implications on the Government. Cost aside, some recommendations require a new approach to infrastructure development or life style and behaviour changes to the community, and their implementation would require public acceptance.

Way forward

8. As the pace for implementing the proposed control measures or achieving the new AQOs would depend on the feasibility and readiness of the community to bear the cost, these have to be thoroughly discussed within the community. Upon receipt of the final report of the Review from the consultant, the Administration will conduct a full-scale public consultation on the proposals as well as the pace, priority and price for their implementation before taking a view on how best the current AQOs are to be updated and what measures to be adopted.

Deliberations by the Subcommittee

9. The Subcommittee is tasked to monitor and study policies as well as public concerns on improving air quality. The Subcommittee held a series of meetings to discuss the preliminary findings of the Review of Hong Kong's AQOs and development of a long-term air quality management strategy for achieving the revised AQOs as well as the way forward.

10. Some members held the view that APCO should be amended to explicitly provide for the protection of public health in setting the new AQOs. Instead of adopting different interim targets for different pollutants, consideration should be given to applying WHO AQGs in one go since there would not be any incentives for further improvement if AQOs were set too low. They were skeptical that the

consultant was trying to use high costs to discourage the public from demanding for more vigorous measures to improve air quality. Other members however supported the adoption of a progressive approach in tightening AQOs to ensure that the new AQOs were most suitable for Hong Kong. Concerted efforts from the Guangdong side were also necessary since air quality in Hong Kong was greatly affected by regional air quality.

11. On the cost-benefit analysis of Phase I measures, members generally considered that the two measures with the highest cost-benefit ratings, viz. early retirement of polluting vehicles and use of ultra low sulphur diesel (USLD) for local vessels, should be take forward earlier. To this end, consideration should be given to mandating the early retirement of polluting vehicles, including franchised buses, using the one-off grant for the early replacement of pre-Euro and Euro I diesel commercial vehicles which had a low take-up rate.

Latest development

12. The Administration intends to brief Members on the "Air Quality Objectives Review - Public Consultation" at the Panel meeting on 29 July 2009 upon the release towards the end of July 2009.

Relevant papers

Information paper provided by the Administration for the Subcommittee on Improving Air Quality meeting on 19 March 2009

http://www.legco.gov.hk/yr08-09/english/panels/ea/ea_iaq/papers/ea_iaq0319cb1-1057-1-e.pdf

Ove Arup & Partners's powerpoint presentation materials on review of Hong Kong's Air Quality Objectives and Development of Long-Term Air Quality Management Strategy (Chinese version only)

http://www.legco.gov.hk/yr08-09/chinese/panels/ea/ea_iaq/papers/ea_iaq0319cb1-1133-1-c.pdf

Minutes of the Subcommittee on Improving Air Quality meeting on 19 March 2009

http://www.legco.gov.hk/yr08-09/english/panels/ea/ea_iaq/minutes/iaq20090319.pdf

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The Current Hong Kong AQO and Achievement Status

Pollutants	Averaging Time	Air Quality Objectives (µg/m ³)	Measured highest Concentrations in 2005 (µg/m ³) (In bracket is/are the station(s) where the highest data was/were recorded)		Status of Achievement	
					% of AQO at Highest Concentration	Evaluation of Achievement
Sulphur Dioxide (SO ₂)	1-hour	800	General Station	453 (Tap Mun)	57	Well achieved
			Roadside Station	476 (Mong Kok)	60	Well achieved
	24-hour	350	General Station	138 (Yuen Long)	39	Well achieved
			Roadside Station	114 (Mong Kok)	33	Well achieved
	Annual	80	General Station	32 (Kwai Chung)	40	Well achieved
			Roadside Station	25 (Central)	31	Well achieved
Nitrogen Dioxide (NO ₂)	1-hour	300	General Station	309 (Central/Western)	103	Not yet achieved
			Roadside Station	345 (Central)	115	Not yet achieved
	24-hour	150	General Station	147 (Tung Chung)	98	Achieved
			Roadside Station	195 (Causeway Bay)	130	Not yet achieved
	Annual	80	General Station	65 (Sham Shui Po)	81	Achieved
			Roadside Station	99 (Central)	124	Not yet achieved
Respirable Suspended Particulates (RSP)	24-hour	180	General Station	217 (Tung Chung)	121	Not yet achieved
			Roadside Station	191 (Causeway Bay)	106	Not yet achieved
	Annual	55	General Station	62 (Yuen Long)	113	Not yet achieved
			Roadside Station	84 (Causeway Bay)	153	Not yet achieved
Total Suspended Particulates (TSP)	24-hour	260	General Station	322 (Kwai Chung)	124	Not yet achieved
			Roadside Station	205 (Mong Kok)	79	Achieved
	Annual	80	General Station	104 (Yuen Long)	130	Not yet achieved
			Roadside Station	112 (Mong Kok)	140	Not yet achieved
Ozone (O ₃)	1-hour	240	General Station	365 (Tap Mun)	152	Not yet achieved
Carbon Monoxide (CO)	1-hour	30,000	General Station	5730 (Tung Chung)	19	Well achieved
			Roadside Station	4370 (Central)	15	Well achieved
	8-hour	10,000	General Station	4541 (Tung Chung)	45	Well achieved
			Roadside Station	3693 (Central)	37	Well achieved
Lead (Pb)	3-month	1.5		0.069 (Tsuen Wan, Annual average)	5	Well achieved