

Review of Hong Kong's Air Quality Objectives

Hong Kong's Air Quality Objectives

1. The Air Pollution Control Ordinance empowers the Government to establish [Air Quality Objectives \(AQOs\)](#) that should be achieved and maintained in order to promote the conservation and best use of air in the public interest. By making references to research results done mainly in the United States (US), a set of AQOs comprising seven major air pollutants has been established since 1987.

The current AQOs and achievement status are at [Annex A](#).

Air Pollution and Control in Hong Kong

2. Hong Kong is facing two air pollution issues, i.e., regional smog problem and local street-level pollution. Despite the success of our vehicle emission control programme to reduce our local emissions, the background air quality of the region, however, has been worsening. As shown in the figure in [Annex B](#), the visibility has been deteriorating despite the decrease of our air pollutant emissions. Smog has now become a common problem for the entire Pearl River Delta (PRD) area, which cannot be resolved without joint efforts with our neighbours, Guangdong Province.

3. To improve our and PRD air quality, the Hong Kong SAR Government reached a consensus with the Guangdong Provincial Government in April 2002 to reduce, on a best endeavour basis, the emission of four major air pollutants, namely sulphur dioxide, nitrogen oxides, respirable suspended particulate and volatile organic compounds by 40%, 20%, 55% and 55% respectively by 2010, using 1997 as the base year. Achieving these targets will enable Hong Kong to meet our AQOs, significantly improve the air quality of the PRD and relieve the regional smog problem.

4. To fully achieve the 2010 emission reduction targets, we are pursuing the following additional emissions reduction measures:

- (a) tightening the motor petrol standard to Euro IV with effect from 1 January 2005;
- (b) requiring the installation of vapour recovery systems for vehicle refuelling at petrol filling stations from 31 March 2005;
- (c) introducing Euro IV emission standards to newly registered vehicles in 2006;
- (d) requiring local power companies to take measures to reduce emissions and increase the use of natural gas in electricity generation; and
- (e) introducing a scheme of control for VOC emissions from selected products.

The Need for Reviewing AQOs

5. Recent scientific research findings have suggested that particulate matters smaller than 2.5 microns have more direct health effects than particulate matters of larger sizes. Moreover, air pollution effects on health may occur at concentration levels lower than previously known. In view of such findings, the need for introducing a new set of air quality standards for particulate matters smaller than 2.5 microns (i.e. PM_{2.5}) and revising the current air quality guidelines and standards has been under examination by a number of countries including the United States (US), the member states of the European Union (EU) and the World Health Organisation (WHO).

6. The US Environmental Protection Agency is now in the process of revising its air quality standards, including those for PM_{2.5}, and is planning to issue the final particulate standards by September 2006 and the ozone standard by end 2007. The EU issued a draft directive in September 2005 on ambient air quality, which includes a proposed PM_{2.5} annual average standard set to take effect in 2010 and to be achieved by 2015. The proposal however needs to go through further examination and will not be finalized until 2007.

7. WHO has established a working group comprising experts from different countries to review and update the European WHO Air Quality Guidelines (AQGs) as well as to extend the AQGs for global application. The WHO working group has recently published its report with a set of proposed new WHO AQGs. In view of the stringency of the revised guidelines, the WHO working group has also recommended interim targets for countries to progressively improve the air quality.

8. The new WHO AQGs have provided a scientific basis for supporting the development of air quality policies and management strategies in various parts of the world for the purpose of protecting human health. The new WHO AQGs accept that the actual air quality standards set in each country will vary according to country-specific approaches in balancing the risks to health, technological feasibility, and other socio-economic considerations. It thus advises that individual governments should consider their own local circumstances carefully when using the WHO air quality guidelines.

9. The new WHO AQGs are much more stringent than our current AQOs (see [Annex C](#) for the comparison table of Hong Kong's AQOs and the proposed new WHO AQGs). In recently published consultation document, UK Government considers it not practical to fully achieve the recommended WHO guideline values everywhere in the UK up to 2020. For some air pollutants, e.g. particulates, the time frame being considered in UK is 2050.

10. In Hong Kong, these new WHO AQGs cannot be met even at Tap Mun where our background air quality monitoring station is located. Preliminary assessment also shows that even if the emissions in Hong Kong were to be eliminated completely, the new WHO AQGs still may not be met. The achievement of the new WHO AQGs will thus require comprehensive, and possibly very drastic measures to be taken not only in Hong Kong, but also in the Mainland over the long term.

11. Measures required may include the extensive use of clean power generation technologies and fuels, clean mass-transit and transportation systems, clean production technologies, very efficient energy saving technologies as well as an urban form designed to permit and promote the use of these technologies. Some of these technologies required may be very costly or are still being developed overseas. Adopting these measures will have far

reaching impact on a wide range of policy areas including energy, transportation, industrial production, urban planning, conservation and people's way of life.

A Comprehensive Study for Reviewing AQOs and Achieving New AQOs

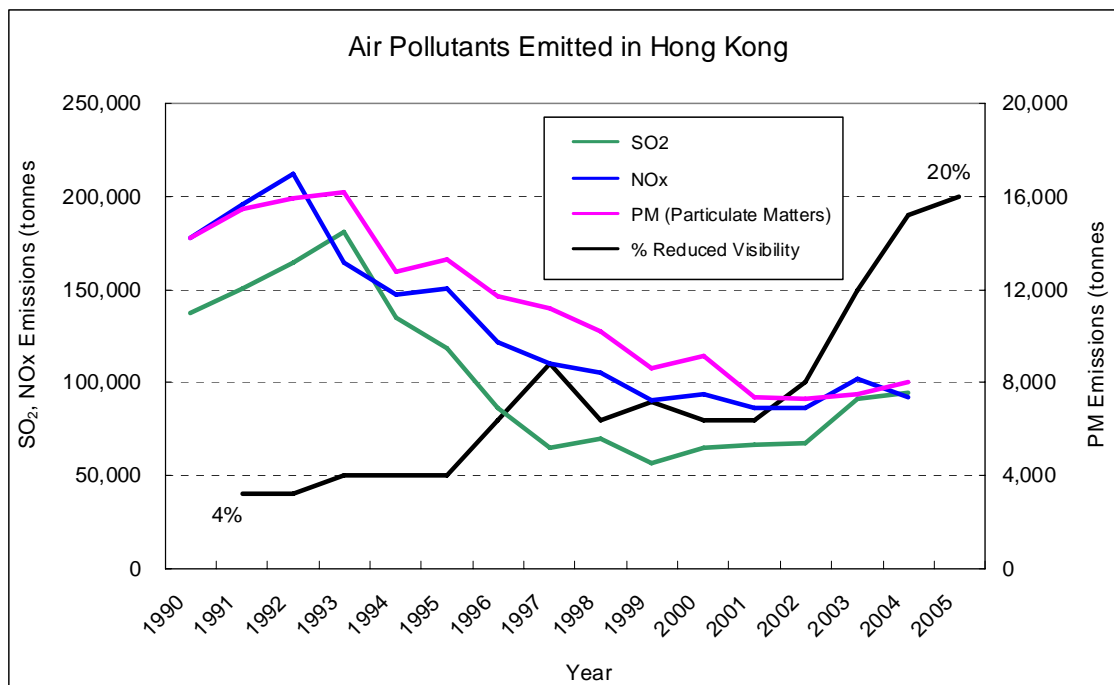
12. In view of the above, the finalisation of a set of revised AQOs for Hong Kong and the implementation plans for their achievement in the long term would be possible only with a thorough public engagement process supported by detailed information on the options and various implications. A comprehensive study is needed to provide the detailed information and analysis required.

13. We have consulted the Advisory Council on the Environment (ACE) on 17 July 2006 on a proposal to conduct the comprehensive study to collect and collate relevant information, conduct analyses and assessments as well as identify and evaluate options and implications for consideration by the Government, for supporting the review of Hong Kong's AQOs and the development of a long term air quality strategy for Hong Kong. The ACE endorsed the proposed study, which will be commissioned before 31 January 2007 and completed in 18 months, i.e., by the 3rd quarter of 2008.

The Current Hong Kong AQO and Achievement Status

Pollutants	Averaging Time	Air Quality Objectives (µg/m ³)	Measured highest Concentrations in 2004 (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	432 (Tung Chung)	54	Well achieved
			Roadside Station	494 (Central)	62	Well achieved
	24-hour	350	General Station	171 (Yuen Long)	49	Well achieved
			Roadside Station	147 (Mong Kok)	42	Well achieved
	Annual	80	General Station	32 (Kwai Chung)	40	Well achieved
			Roadside Station	28 (Central)	35	Well achieved
Nitrogen Dioxide (NO ₂)	1-hour	300	General Station	317 (Yuen Long)	106	Not yet achieved
			Roadside Station	386 (Central)	129	Not yet achieved
	24-hour	150	General Station	169 (Kwun Tong)	113	Not yet achieved
			Roadside Station	203 (Central)	135	Not yet achieved
	Annual	80	General Station	70 (Kwai Chung & Sham Shui Po)	88	Achieved
			Roadside Station	105 (Central & Mong Kok)	131	Not yet achieved
Respirable Suspended Particulates (RSP)	24-hour	180	General Station	225 (Yuen Long)	125	Not yet achieved
			Roadside Station	222 (Causeway Bay)	123	Not yet achieved
	Annual	55	General Station	71 (Yuen Long)	129	Not yet achieved
			Roadside Station	88 (Causeway Bay)	160	Not yet achieved
Total Suspended Particulates (TSP)	24-hour	260	General Station	320 (Yuen Long)	123	Not yet achieved
			Roadside Station	220 (Mong Kok)	85	Achieved
	Annual	80	General Station	113 (Yuen Long)	141	Not yet achieved
			Roadside Station	124 (Mong Kok)	155	Not yet achieved
Ozone (O ₃)	1-hour	240	General Station	403 (Tung Chung)	168	Not yet achieved
Carbon Monoxide (CO)	1-hour	30,000	General Station	3940 (Tung Chung)	13	Well achieved
			Roadside Station	4830 (Central)	16	Well achieved
	8-hour	10,000	General Station	3385 (Tung Chung)	34	Well achieved
			Roadside Station	3423 (Mong Kok)	34	Well achieved
Lead (Pb)	3-month	1.5		0.322	21	Well achieved

Air Pollutants Emitted in Hong Kong vs Reduced Visibility



Comparison of HK AQOs and WHO Air Quality Guidelines in $\mu\text{g}/\text{m}^3$

Pollutant	Averaging Time	HK AQO	Existing WHO AQGs	Proposed New WHO AQGs^(*)
Sulphur Dioxide	10-minute	-	500	500
	1-hour	800 (3 exceedances per yr)	-	-
	24-hour	350 (1 exceedance per yr)	125	20 (IT-1: 125, IT-2: 50)
	Annual	80	50	-
Total Suspended Particulate	24-hour	260 (1 exceedance per yr)	-	-
	Annual	80	-	-
Respirable Suspended Particulate (PM10)	24-hour	180 (1 exceedance per yr)	No guideline values are recommended but provided the dose response relationships.	50 (IT-1: 150, IT-2: 100, IT-3: 75)
	Annual	55	-	20 (IT-1: 70, IT-2: 50, IT-3: 30)
Fine Suspended Particulate (PM2.5)	24-hour	-	No guideline values are recommended but provided the dose response relationships.	25 (IT-1: 75, IT-2: 50, IT-3: 37.5)
	Annual	-	-	10 (IT-1: 35, IT-2: 25, IT-3: 15)
Nitrogen Dioxide	1-hour	300 (3 exceedances per yr)	200	200
	24-hour	150 (1 exceedance per yr)	-	-

Pollutant	Averaging Time	HK AQO	Existing WHO AQGs	Proposed New WHO AQGs^(*)
	Annual	80	40	40
Ozone	1-hour	240 (3 exceedances per yr)	-	-
	8-hour	-	120	100 (IT-1: 160)
Carbon Monoxide	15-minute	-	100,000	-
	30-minute	-	60,000	-
	1-hour	30,000 (3 exceedances per yr)	30,000	-
	8-hour	10,000 (1 exceedance per yr)	10,000	-
Lead	3-month	1.5	-	-
	Annual	-	0.5	-

Note: ^(*) As included in WHO's Report of Working Group Meeting held in October 2005 and released in February 2006. IT stands for interim target.