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For Advice

A Proposal for Reviewing the Air Quality Objectives and Developing A Long Term Air Quality Strategy

PURPOSE

This paper seeks Members' advice on launching a comprehensive study followed by a thorough public engagement process to review Hong Kong's Air Quality Objectives (AQOs) and develop a long-term strategy on air quality.

BACKGROUND

2. The Air Pollution Control Ordinance empowers the Government to establish 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 air pollutants has been established since 1987. The current AQOs and achievement status are at **Annex A**.

Current Efforts and Issues

3. In recent years, Hong Kong has been facing two air pollution issues. One is local street-level pollution. The other is the regional smog problem. Diesel vehicles are the main source of street-level pollution. Smog, however, is caused by a combination of pollutants from motor vehicles, industry and power plants both in Hong Kong and in the Pearl River Delta (PRD) region.

4. To tackle emissions from motor vehicles, particularly the diesel vehicles, in 2000, the Government embarked on a comprehensive motor vehicle emission control programme with a view to reducing the respirable suspended particulates (RSP) and nitrogen oxides (NOx) emissions in the urban area by about 80% and 30% respectively by end 2005. The key measures include –

(a) replacing diesel taxis and light buses with liquefied petroleum gas (LPG) vehicles;

(b) introducing Euro III emission standards in tandem with the European Union;

(c) retrofitting pre-Euro diesel vehicles with particulate traps or catalytic converters;

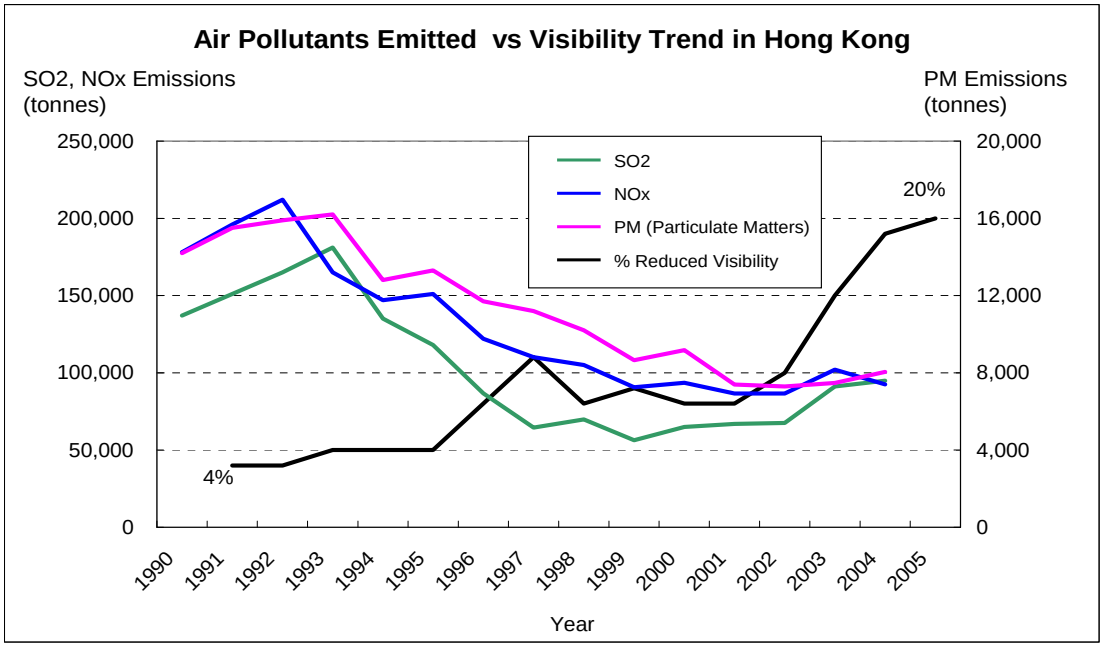
(d) deploying chassis dynamometers to test diesel vehicle smoke and take stronger enforcement actions against smoky vehicles; and

(e) introducing ultra low sulphur diesel (ULSD) and mandating its use five years ahead of Europe.

5. The programme has been successful and yielded concrete results. RSP and NOx emissions from vehicles in the urban area have been reduced by about 80% and 40% respectively. These reductions have brought discernible air quality improvements at the roadside. Against a background of fast increasing regional air pollution, RSP and NOx levels were reduced by 14% and 17% respectively in 2005 as compared with the 1999 levels. The number of smoky vehicles has also been reduced by about 80%.

6. The background air quality of the region, however, has been worsening. Notwithstanding the very substantial reduction in local emissions, the visibility has been deteriorating quickly since the mid 1990's (see Figure 1 below). The same phenomenon is observed throughout PRD. Smog has now become a common problem for the entire PRD area, which cannot be resolved without joint efforts with our neighbour, Guangdong Province.

Figure 1: Air Pollutants Emitted in Hong Kong vs. Reduced Visibility[#]



[#] Percentage of Reduced Visibility refers to the percentage of time in a year with visibility less than 8 kilometres and relative humidity not exceeding 80%.

7. To improve regional air quality, the Hong Kong SAR Government reached a consensus with Guangdong Provincial Government in April 2002 to reduce, on a best endeavour basis, the emission of four major air pollutants, sulphur dioxide (SO2), NOx, RSP and volatile organic compounds (VOC) by 40%, 20%, 55% and 55% respectively in the region 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 Pearl River Delta and relieve the regional smog problem.

8. In December 2003, the two governments jointly drew up the PRD Regional Air Quality Management Plan (the "Management Plan") with a view to meeting the above emission reduction targets. The PRD Air Quality Management and Monitoring Special Panel was set up under the Hong Kong/Guangdong Joint Working Group on Sustainable Development and Environmental Protection (JWG) to follow up on the tasks under the Management Plan. A Regional Air Quality Monitoring Network is now in full operation to provide comprehensive and accurate air quality data.

Progress in Achieving the 2010 Targets In Hong Kong

9. To fully achieve the 2010 emission reduction targets, the following additional emissions reduction measures are being pursued –

(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 the local power companies to take measures to reduce emissions and increase the use of natural gas in electricity generation; and

(e) introducing a scheme to control VOC emissions from selected products.

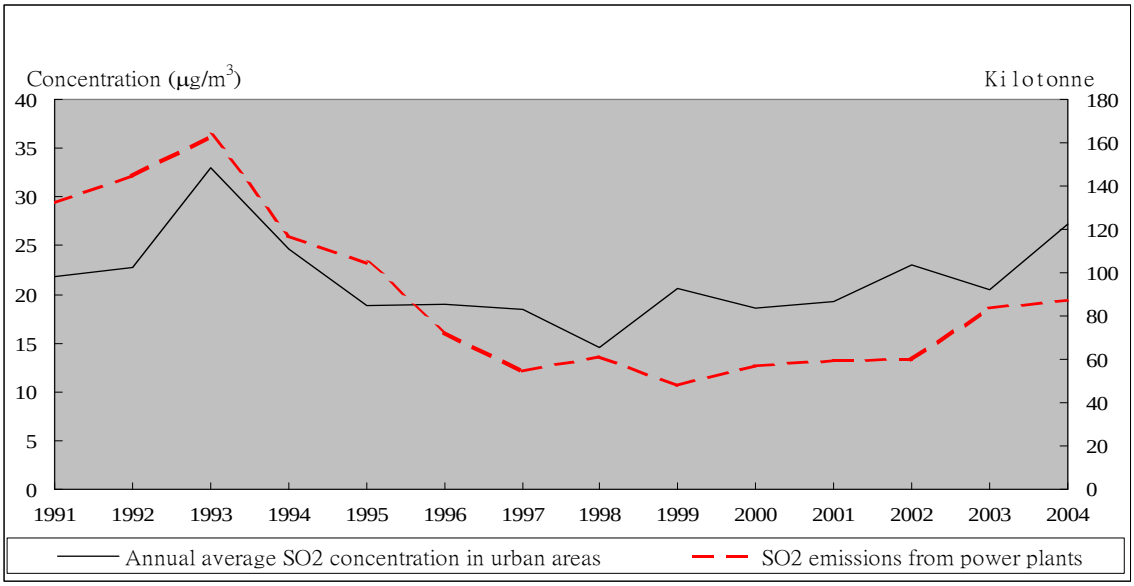
10. Hong Kong has been making good progress towards the 2010 targets for NOx, RSP and VOC. For SO2, however, much of the effort has been offset by the increase in emissions from the power plants. Details are presented in the table below –

Table: Progress in Achieving the 2010 Targets

	1997 Emission (tonnes)	2004 Emission (tonnes)	Changes 1997-2004	2010 Targets
SO2	64,500	94,800	+47%	-40%
NOx	110,000	92,500	-16%	-20%
RSP	11,200	8,040	-28%	-55%
VOC	54,400	41,900	-23%	-55%

11. Electricity generation remains the biggest source of air pollution in Hong Kong. It accounts for 92% of the SO2 and half of the NOx and RSP emissions. As indicated in Figure 2 below, the SO2 emissions by local power plants is highly correlated to the SO2 concentration in our urban areas. Therefore, to achieve the 2010 emissions reduction targets and sustained improvement in our air quality, the power companies must substantially reduce their emissions.

Figure 2: SO2 Emitted by Power Companies and Levels in Urban Areas



12. On 12 October 2005, in his Policy Address, the Chief Executive reiterated the Government's commitment to achieve the 2010 emissions reduction targets. We have asked the power companies to accelerate the timing of emissions reduction projects, increase the use of ultra-low sulphur coal and use natural gas for power generation as much as possible. In addition, we are progressively tightening the emission caps upon the renewal of the power companies' Specified Process Licences (SPLs) issued under the Air Pollution Control Ordinance.

13. To ensure achievement of the 2010 emission caps, in the Stage II "Consultation Paper on Future Development of the Electricity Market in Hong Kong" issued on 30 December 2005, we have proposed that the permitted rate of return on all fixed assets of the power companies be linked to their achievement of the emission caps stipulated in the SPLs, and reduced if they do not achieve the emission caps.

Cooperation with the Mainland

14. At the Sixth Meeting of the JWG held on 20 December 2005, the two sides noted that there had been significant progress in implementing the Management Plan during 2005.

15. Since 30 November 2005, the Regional Air Quality Monitoring Network jointly established under the Management Plan had been commissioned and the PRD Regional Air Quality Index is now published on a daily basis. The enhanced control measures under the Management Plan were well on schedule. Moreover, the two sides exchanged ideas and know-how on air quality monitoring, air emissions inventory compilation, preventive measures on vehicles emissions and continuous emissions monitoring of stationary pollution sources.

16. The JWG has agreed to include additional measures in the Management Plan. They include introducing emission caps for the power plants in Hong Kong, tightening control over pollutant emissions from major pollution sources in the PRD, studying the feasibility of advancing the implementation of more stringent motor vehicle emission standards in Mainland cities, and stepping up regular inspection of in-use motor vehicles. The two governments will also strengthen exchanges and co-operation on continuous emissions monitoring of stationary pollution sources and enhance the reliability of the systems on both sides and the comparability of data.

17. In 2006, the major tasks under the Management Plan include the following –

(a) on combating air pollution from the power generation industry, Phase I construction of the liquefied natural gas (LNG) trunk pipeline in Guangdong Province will be completed in 2006 and a number of LNG power plants are expected to be commissioned in phases. This will substantially reduce the PRD's reliance on the more polluting fuel oil and coal. Moreover, existing oil-fired and coal-fired power plants in Guangdong Province will continue to install flue gas desulphurization systems;

(b) on controlling emissions from motor vehicles, the Guangdong Provincial Government will strive to advance the implementation of National III motor vehicle emission standards (on a par with Euro III

ones) in PRD cities while Hong Kong will implement Euro IV motor vehicle emission standards in line with the EU in 2006;

(c) the data collected by the Regional Air Quality Monitoring Network will be analysed by the environmental protection authorities of the two governments. A regional air quality monitoring report will be submitted on a half-yearly basis, providing the public with more information on the air quality in the PRD;

(d) the environmental protection authorities of the two governments will continue to strengthen technical exchanges and joint studies, especially on continuous emissions monitoring of stationary pollution sources and commissioning studies on regional air pollution on a need basis; and

(e) details of the Emission Trading Pilot Scheme for Thermal Power Plants in the PRD Region being jointly developed by the two sides are expected to be finalised in 2006. Subject to agreement of the two governments, details will be presented to the power plants in Hong Kong and Guangdong in the third quarter of 2006 so that prospective participants can identify their trading partners and draw up emission trading agreements.

International Developments on AQO Reviews

18. We have been monitoring the international developments on reviews of air quality standards and objectives with a view to examining the need for revising Hong Kong's AQOs from a scientific perspective taking into account also local factors and considerations. 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. PM2.5) 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).

19. The US Environmental Protection Agency is now in the process of revising its air quality standards, including those for PM2.5, 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 PM2.5 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.

20. 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. A comparison of our current AQOs and the proposed new WHO AQGs and interim targets are summarised in **Annex B**.

21. We expect that WHO will publish full documents on the new WHO AQGs later this year. The publication will provide 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 WHO working group accepts 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.

PROPOSAL

22. The new WHO AQGs are much more stringent than our current AQOs. In a 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.

23. In Hong Kong, the new WHO AQGs cannot be met at present even at Tap Mun, our background air quality monitoring station. It implies 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.

24. The measures required will 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. In view of these, the finalisation of a set of revised AQOs 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 implications, financial implications in particular. Therefore, we propose to launch a comprehensive study to –

(a) review and characterize the current state of air quality in Hong Kong, including the prevailing exposure levels, developing trend, major contributing sources and factors as well as policies, programmes and legislation in place for controlling air pollution;

(b) propose specific measures required and options available for achieving the interim targets and the guideline levels if Hong Kong is to adhere to the new WHO AQGs. The need for working in conjunction with neighbouring cities and provinces should also be thoroughly examined;

(c) assess the implications of implementing the measures identified under different options, including economic costs, time required for introducing the measures, the need to work with the Mainland as well as impacts on other policy areas such as energy, transportation, industrial development, urban planning and conservation; and

(d) taking into account (b) and (c), derive practical and achievable options for revising Hong Kong's AQOs and implementing the strategies and measures in the form of an Action Plan required to achieve the revised AQOs, with implications identified for each options, for the purpose of a thorough public engagement process.

25. We plan to commission the study in early 2007. The study will take about 18 months to complete, i.e. by the third quarter of 2008. We plan to launch a public engagement process in late 2008 for finalising action on the new AQOs and the required long-term strategy on air quality within 2009.

26. To ensure that the study will be properly conducted, we plan to set up a steering committee comprising representatives from relevant policy bureaux and departments, members of the Advisory Council on the Environment as well as relevant experts and academics.

ADVICE SOUGHT

27. Members are invited to comment on and endorse the proposed study outlined in paragraphs 22 to 26.

Environmental Protection Department
July 2006