

# 立法會 *Legislative Council*

LC Paper No. CB(1)705/15-16(04)

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## **Panel on Environmental Affairs**

**Meeting on 30 March 2016**

### **Background brief on Air Quality Objectives of Hong Kong prepared by the Legislative Council Secretariat**

#### **Purpose**

This paper provides background information on the Air Quality Objectives ("AQOs") of Hong Kong. It also gives a brief account of the major views and concerns expressed by Members when related issues were discussed by the relevant committees of the Legislative Council ("LegCo") in the 2011-2012 to 2015-2016 legislative sessions.

#### **Background**

##### AQOs

2. AQOs of Hong Kong are stipulated in the Air Pollution Control Ordinance ("APCO") (Cap. 311)<sup>1</sup> as the air quality that should be achieved and maintained in order to promote the conservation and best use of air in the public interest. AQOs

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<sup>1</sup> Previously, the AQOs which were in place since 1987 were laid down in the Air Control Zones (Consolidation) Statement of Air Quality Objectives (Cap. 311H). The Statement and the empowering provision for its publication were subsequently repealed, and the same AQOs were set out in the Technical Memorandum for Specifying Air Quality Objectives for Hong Kong in 1994. With the passage of the Air Pollution Control (Amendment) Bill 2013 on 10 July 2013, the power of the Secretary for the Environment to promulgate AQOs in a Technical Memorandum was repealed and instead, a set of new AQOs was provided in APCO.

are also benchmarks for assessing the air quality impact of specified processes under APCO and of designated projects under the Environmental Impact Assessment Ordinance ("EIAO") (Cap. 499)<sup>2</sup>.

3. In response to the release of the new Air Quality Guidelines by the World Health Organization ("WHO") in 2006 for global application for protection of public health ("the WHO Guidelines")<sup>3</sup>, the Environmental Protection Department ("EPD") commissioned a consultancy study in 2007 on updating the AQOs which had been in place since 1987, and consulted the public on the recommendations in 2009<sup>4</sup>. With the passage of the Air Pollution Control (Amendment) Bill 2013 on 10 July 2013, the new AQOs took effect from 1 January 2014 and since then, are to be reviewed at least once every five years.

4. The new AQOs, which are benchmarked against a combination of both interim and ultimate air quality targets in the WHO Guidelines, set out the standards for seven types of air pollutants, namely sulphur dioxide, nitrogen dioxide, respirable suspended particulates ("RSP"), fine suspended particulates ("PM2.5"), carbon monoxide, ozone and lead (**Appendix I**)<sup>5</sup>.

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<sup>2</sup> The Technical Memorandum on Environmental Impact Assessment Process issued under EIAO sets out unified technical guidelines and criteria for the Environmental Impact Assessment ("EIA") procedures. The Technical Memorandum requires EIA studies to adopt the environmental objectives or requirements stipulated under various pollution controls and other relevant ordinances as the criteria for assessment. When there is update to these statutory objectives or requirements, it will automatically be applicable to EIAO at the same time and it is not necessary to conduct separate review or revision for EIAO.

<sup>3</sup> The guidelines provide that "when the standards are set 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. Compliance criteria are defined in each country in order to compare the most representative data with the standards, and to minimize the designation of non-compliance owing to uncontrollable circumstances such as extreme weather. Such compliance criteria can be determined by evaluating historical data in the region as well as variability in weather and pollution patterns."

<sup>4</sup> The Administration launched a four-month public consultation from July 2009 to gauge the public's response to the recommendations. The consultation findings showed a general support for the new AQOs, adoption of a staged approach in achieving the targets laid down in the WHO Guidelines and implementation of the proposed package of air quality improvement measures.

<sup>5</sup> Ultimate air quality targets in the WHO Guidelines were selected for four pollutants, i.e. sulphur dioxide, nitrogen dioxide, carbon monoxide and lead, in the new AQOs.

## Air quality management in Hong Kong

5. To attain the new AQOs, the Administration has been taking forward a package of new air quality improvement measures covering land and sea transport, power plants and non-road mobile machinery. The key measures are set out in **Appendix II**. In March 2013, the Environment Bureau released "A Clean Air Plan for Hong Kong" to outline comprehensively the challenges Hong Kong was facing with regard to air quality and to give an overview of the relevant air quality improvement policies and measures.

6. At the regional level, Hong Kong has been joining hands with Guangdong and Macao to improve air quality of the Pearl River Delta ("PRD") Region. For instance, in November 2012, the governments of Hong Kong and Guangdong endorsed an emission reduction plan for the PRD Region up to 2020 which set the 2015 emission reduction targets and 2020 emission reduction ranges for four major air pollutants<sup>6</sup>. In September 2014, the governments of Guangdong, Hong Kong and Macao jointly signed the "Cooperation Agreement on Regional Air Pollution Control and Prevention among Hong Kong, Guangdong and Macao" with a view to fostering regional cooperation on air pollution control and prevention.

### **Major views and concerns expressed by Members**

7. The former Subcommittee on Improving Air Quality and the Subcommittee on Issues Relating to Air, Noise and Light Pollution, which were formed under the Panel on Environmental Affairs ("the Panel"), were consulted on the legislative proposal to update the AQOs at the meetings on 16 April 2012 and 25 February 2013 respectively. A bills committee of LegCo was formed in March 2013 to scrutinize the Air Pollution Control (Amendment) Bill 2013. Issues relating to AQOs were brought up at the Panel meeting on 27 April 2015 when the Administration briefed the Panel on the progress of air quality improvement measures, and during examination of the Estimates of Expenditures 2014-2015 and 2015-2016. The major views and concerns expressed by Members on issues relating to AQOs during these discussions are summarized in the ensuing paragraphs.

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<sup>6</sup> The four pollutants are sulphur dioxide, nitrogen oxides, RSP and volatile organic compounds.

### AQOs for PM2.5 and RSP

8. Some Members had expressed concern about the adoption of the interim air quality targets (instead of the ultimate targets) in the WHO Guidelines as the new AQOs for certain pollutants. For instance, the interim target of 75 micrograms per cubic metre on the 24-hour average concentration limit for PM2.5 under the new AQOs was three times of that under the ultimate targets in the Guidelines. Members also queried the justifications for setting the number of exceedances allowed in the new AQOs.

9. The Administration explained that while the WHO Guidelines were released for global application for the protection of public health, WHO accepted the need for governments to set national standards according to their own circumstances, taking into account the local air quality situation, practicable technologies, as well as economic, political and social factors. The Guidelines also set interim targets for governments to reduce air pollution in a progressive manner and achieve the ultimate targets. When setting the AQO of PM2.5, the Administration considered that PM2.5 level was under strong regional influence and the ultimate target of PM2.5 level under the Guidelines could unlikely be attained in the near future. A more pragmatic approach was therefore to set the AQO of PM2.5 at the interim target level of the Guidelines. The Administration further advised that the number of exceedances established for each of the new AQOs was in accordance with the Guidelines and the practices of advanced countries such as the United States ("US") and the European Union countries after taking into account the local circumstances. The Administration would consider whether the number of exceedances could be tightened in the future review of AQOs.

10. Some Members suggested the Government include RSP with a particle size of 2.5 µm to 10 µm (also known as coarse suspended particulates) in the AQOs. The Administration advised that coarse suspended particulates were part of RSP. As there was no international benchmark on this pollutant, the Administration had no plan to include it in the AQOs. The Administration would review the scope of pollutants in AQOs in the light of the latest international development on air quality standards.

### Air quality monitoring network

11. Members enquired about whether the Administration would expand the air quality monitoring network to cover all 18 districts in Hong Kong. The Administration explained that EPD operated a comprehensive air quality

monitoring network comprising general air quality monitoring stations ("AQMSs") and roadside AQMSs. In determining the sites of AQMS in the network, EPD had taken into account a number of factors, including the spatial distribution of the air quality monitoring network, the coverage in different types of development areas, local population, the distribution of traffic flow and pollution sources, the capability in monitoring regional air pollution, topography and meteorology. The Administration considered that the current network had an adequate spatial distribution of general AQMSs covering different land uses of the urban, new town and rural areas. It was thus not unnecessary to set up an AQMS in each of the 18 districts.

12. For roadside AQMSs, the existing ones in Central, Causeway Bay and Mongkok are built in the busy corridors of urban areas with high traffic and pedestrian flow and surrounded by high-density built environment. The data from these roadside AQMSs were representative of the roadside air quality of typical places with heavy vehicular and pedestrian traffic in the urban areas. As such, it would not be necessary to increase the number of roadside AQMSs. As regards Members' suggestion of benchmarking the existing Air Pollution Index against the new AQOs, the Administration advised that it would improve the Index system to tie in with the updating of AQOs.

#### Transitional arrangement for implementing AQOs

13. Members noted that within a transitional period of 36 months from the commencement of the new AQOs on 1 January 2014, the new AQOs would not apply to an application for variation of an Environmental Permit issued before this date. There were concerns that this provision might create a loophole allowing works project proponents not to comply with the more stringent requirements under the new AQOs.

14. The Administration advised that under EIAO, approval of EIA reports and issue of Environmental Permits were based on the prevailing AQOs at the time the decision was made. There would be major cost and programming implications if the new AQOs should apply to works projects already granted with an Environmental Permit before the new AQOs had come into operation. Providing a transitional period would give regulatory certainty for proponents of works projects that had already completed the EIA process while preserving the integrity of the EIA system.

## Mechanism and frequency of review

15. Members urged the Administration to commence the next AQO review as early as possible with a view to devising a new set of AQOs for the five years starting from 1 January 2019 and formulating corresponding air quality improvement plans. The Administration advised that it would endeavour to complete the AQO review by the end of 2018. In conducting the AQO review, it would assess the latest situation of air quality, effectiveness of air quality improvement measures, emission trend of the PRD Region, development of emission reduction technology, health impacts of air pollution, social circumstances, etc., with a view to exploring the feasibility and plans of further tightening the AQOs.

16. On whether the AQO review could be conducted more frequently (say once every two years), or a mid-term review be carried out during the interim to take account of the changes in air quality, the Administration advised that it was necessary to allow reasonable time for the relevant air quality improvement measures to take effect before considering follow-up actions in relation to the implementation of AQOs. Given the complex and wide ranging issues involved, the review frequency of every five years was considered appropriate. A similar review frequency was also adopted in US.

## **Council questions**

17. At the Council meetings on 11 June and 26 November 2014, and 18 November 2015, Hon CHAN Hak-kan and Hon Dennis KWOK raised questions respectively relating to PM2.5 level and AQOs. Issues covered in the questions include the measures to reduce vehicle emissions and educate the public on the health impacts of PM2.5, and the progress of formulating the approach and methodology for conducting the AQO review. The questions and the Administration's replies are hyperlinked in **Appendix III**.

## **Other relevant information**

18. In October 2012, the Director of Audit conducted a review of the Government's effort in improving the air quality in Hong Kong. Two Audit Reports were issued, namely, "Monitoring and reporting of air quality" and "Implementation of air-quality improvement measures" (see Chapters 1 and 2 of the Director of Audit's Report No. 59). Subsequently, the Administration

provided the latest progress of implementing the Director of Audit's recommendations on issues covered in Report No. 59. The relevant progress reports were issued to Panel members vide LC Paper Nos. CB(1)930/13-14(01) and CB(1)553/14-15(01) on 18 February 2014 and 16 February 2015 respectively.

### **Latest development**

19. At the meeting on 30 March 2016, the Administration will brief the Panel on the approach and work plan for conducting the upcoming review on AQOs.

### **Relevant papers**

20. A list of relevant papers is set out in **Appendix III**.

Council Business Division 1  
Legislative Council Secretariat  
18 March 2016

## Appendix I

### Air Quality Objectives of Hong Kong

Pollutant	Averaging time	Concentration limit (i) ( $\mu\text{g}/\text{m}^3$ )	Number of exceedances allowed
Sulphur dioxide	10-minute	500	3
	24-hour	125	3
Respirable suspended particulates (i.e. PM10) (ii)	24-hour	100	9
	Annual	50	Not applicable
Fine suspended particulates (i.e. PM2.5) (iii)	24-hour	75	9
	Annual	35	Not applicable
Nitrogen dioxide	1-hour	200	18
	Annual	40	Not applicable
Ozone	8-hour	160	9
Carbon monoxide	1-hour	30 000	0
	8-hour	10 000	0
Lead	Annual	0.5	Not applicable

Note:

- (i) All measurements of the concentration of gaseous air pollutants, i.e. sulphur dioxide, nitrogen dioxide, ozone and carbon monoxide, are to be adjusted to a reference temperature of 293 Kelvin and a reference pressure of 101.325 kilopascal.
- (ii) Respirable suspended particulates means suspended particles in air with a nominal aerodynamic diameter of 10  $\mu\text{m}$  or less.
- (iii) Fine suspended particulates means suspended particles in air with a nominal aerodynamic diameter of 2.5  $\mu\text{m}$  or less.

[Source: [Website of the Environmental Protection Department](#)]



**Air Quality Improvement Measures**

**(A) Emission control for vehicles**

1. Early Retirement of heavily polluting vehicles
2. "Carrot and stick" approach to phase out pre-Euro IV diesel commercial vehicles
3. Wider use of hybrid/electric vehicles or other environment-friendly vehicles
4. Retrofitting Euro II and III franchised buses with selective catalytic reduction devices to reduce their nitrogen oxides emissions
5. Tightening the emission control regime on liquid petroleum gas and petrol vehicles through remote sensing equipment and dynamometer tests

**(B) Emission control for vessels**

6. Tightening fuel standard for local vessels
7. Mandatory fuel switch for ocean going vessels while at berth in Hong Kong waters
8. Measures for government vessels to reduce nitrogen oxides emissions

**(C) Emission control for power plants and other operations**

9. Increasing the ratio of natural gas in local electricity generation
10. Imposing emission control for non-road mobile machinery
11. Electrification of aviation ground support equipment
12. Strengthening volatile organic compounds control

**(D) Road traffic-related measures**

13. Low emission zones
14. Car-free zone/pedestrianization scheme
15. Bus route rationalization

**(E) Infrastructure development and planning**

16. Expanding rail network
17. Developing cycle tracks in new development areas

**(F) Energy efficiency measures**

18. Mandatory implementation of the Building Energy Codes
19. Review of coverage of and grading standards under the Mandatory Energy Efficiency Labelling Scheme
20. Light-emitting diode or equivalent alternatives for traffic signal/street lighting
21. Tree planting/roof-top greening
22. District cooling system for Kai Tak Development

[Source: Adapted from Appendix V of the Report of the Bills Committee on Air Pollution Control (Amendment) Bill 2013 (LC Paper No. [CB\(1\)1464/12-13](#))]

## Appendix III

### Air quality objectives of Hong Kong

#### List of relevant papers

Date of meeting	Event	Paper
16 April 2012	Meeting of the Subcommittee on Improving Air Quality under the Panel on Environmental Affairs	Administration's paper on update of Air Quality Objectives (LC Paper No. <a href="#">CB(1)1532/11-12(01)</a> )  Minutes (LC Paper No. <a href="#">CB(1)2074/11-12</a> )
25 February 2013	Meeting of the Subcommittee on Issues Relating to Air, Noise and Light Pollution under the Panel on Environmental Affairs	Administration's paper on "Interface between the Environmental Impact Assessment Ordinance (Cap. 499) and the Air Pollution Control Ordinance (Cap. 311)" (LC Paper No. <a href="#">CB(1)567/12-13(01)</a> )  Minutes (LC Paper No. <a href="#">CB(1)1365/12-13</a> )
20 March 2013	Air Pollution Control (Amendment) Bill 2013 tabled before the Legislative Council	<a href="#">The Bill</a>  <a href="#">Legislative Council Brief on Air Pollution Control (Amendment) Bill 2013</a> (EP CR 9/150/34)  <a href="#">Legal Service Division report</a> (LC Paper No. LS31/12-13)
April to June 2013	Bills Committee on Air Pollution Control (Amendment) Bill 2013 scrutinized the Bill	Report of the Bills Committee (LC Paper No. <a href="#">CB(1)1464/12-13</a> )

Date of meeting	Event	Paper
1 April 2014	Special meeting of Finance Committee for examination of Estimates of Expenditure 2014-2015	Written question raised by Member and Administration's reply (Reply serial number: <a href="#">ENB292</a> )
30 March 2015	Special meeting of Finance Committee for examination of Estimates of Expenditure 2015-2016	Written questions raised by Members and Administration's replies (Reply serial numbers: <a href="#">ENB071</a> , <a href="#">091</a> , <a href="#">130</a> , <a href="#">164</a> , <a href="#">276</a> , <a href="#">280</a> and <a href="#">307</a> )
27 April 2015	Meeting of the Panel on Environmental Affairs	Administration's paper on "Progress of air quality improvement measures" (LC Paper No. <a href="#">CB(1)763/14-15(03)</a> )  Background brief on "Progress of air quality improvement measures" prepared by the Legislative Council Secretariat (LC Paper No. <a href="#">CB(1)763/14-15(04)</a> )  Minutes (LC Paper No. <a href="#">CB(1)979/14-15</a> )

**Hyperlink to relevant document:**

Government bureau	Document
Environment Bureau in collaboration with Transport & Housing Bureau, Food & Health Bureau and Development Bureau	<a href="#">A Clean Air Plan for Hong Kong</a>

**Hyperlinks to Director of Audit's Report No. 59 and related reports:**

<b>Date</b>	<b>Report/Progress reports</b>
26 October 2012	Director of Audit's Report No. 59 <a href="#">Chapter 1</a> on "Monitoring and reporting of air quality" <a href="#">Chapter 2</a> on "Implementation of air-quality improvement measures"
18 February 2014*	Referral from the Public Accounts Committee on issues relating to "Implementation of air-quality improvement measures" (the referral memo and an extract of the relevant report) (LC Paper No. <a href="#">CB(1)930/13-14(01)</a> )
16 February 2015*	Referral from the Public Accounts Committee on issues relating to "Monitoring and reporting of air quality" and "Implementation of air-quality improvement measures" (the referral memo and an extract of the relevant report) (LC Paper No. <a href="#">CB(1)553/14-15(01)</a> )

\*Issuance date

**Hyperlinks to relevant Council Questions:**

<b>Date</b>	<b>Council Question</b>
11 June 2014	<a href="#">Press release</a> on Council question (written) raised by Hon CHAN Hak-kan
26 November 2014	<a href="#">Press release</a> on Council question (oral) raised by Hon Dennis KWOK
18 November 2015	<a href="#">Press release</a> on Council question (oral) raised by Hon CHAN Hak-kan