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Panel on Environmental Affairs

Meeting on 16 December 2019

Updated background brief on review of Air Quality Objectives prepared by the Legislative Council Secretariat

Purpose

This paper provides updated background information on the review of the Air Quality Objectives ("AQOs") of Hong Kong, and gives a brief account of the major views and concerns expressed by Members when related issues were discussed by relevant committees of the Legislative Council ("LegCo").

Background

Air Quality Objectives

2. AQOs of Hong Kong are stipulated in the Air Pollution Control Ordinance (Cap. 311) ("APCO") as the objectives that should be achieved and maintained in order to promote the conservation and best use of air in the public interest. AQOs are also benchmarks for assessing the air quality impact of specified processes under APCO and of designated projects under the Environmental Impact Assessment Ordinance (Cap. 499) ("EIAO").¹

3. In response to the release of the then new Air Quality Guidelines ("AQGs") by the World Health Organization ("WHO") in 2006, the Environmental Protection Department ("EPD") commissioned a consultancy study in 2007 on updating the former set of AQOs of Hong Kong which had been in place since 1987. Findings of a public consultation conducted in 2009 indicated general public support for the proposal to update the AQOs. With the passage of the Air Pollution Control (Amendment) Bill 2013 on 10 July 2013,

¹ 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 control ordinances and other relevant ordinances as the criteria for assessment. Any update to these statutory objectives or requirements will automatically be applicable to EIAO at the same time.

the updated set of AQOs (which are the prevailing AQOs) took effect from 1 January 2014.

4. The prevailing AQOs are benchmarked against a combination of interim and ultimate air quality targets in WHO's AQGs, and set out the standards for seven types of air pollutants, namely sulphur dioxide ("SO₂"), respirable suspended particulates ("PM₁₀"), fine suspended particulates ("PM_{2.5}"), nitrogen dioxide ("NO₂"), ozone ("O₃"), carbon monoxide and lead (**Appendix I**).

Review of Air Quality Objectives

5. APCO requires the Secretary for the Environment to review AQOs at least once in every five years and submit to the Advisory Council on the Environment ("ACE") a report of the review. The Administration embarked on the AQOs review in mid-2016 to assess air quality improvements in 2025 and the scope for tightening of AQOs. In line with the practices of the European Union ("EU") and the United States, the AQOs review encompasses the following key tasks:

- (a) appraising the latest development in respect of air science and the health effects of air pollution;
- (b) examining the current air pollution levels and trends, and progress and effectiveness of committed air quality improvement measures;
- (c) identifying new practicable air quality improvement measures and conducting cost benefit analysis of the measures;
- (d) developing an air quality management plan for further improving air quality; and
- (e) assessing air quality in future under different control scenarios and the scope for further tightening AQOs for recommending a way forward.

6. An AQOs Review Working Group ("Working Group") chaired by the Under Secretary for the Environment was formed in May 2016 to engage relevant stakeholders.² Four dedicated subgroups on Road Transportation,

² The Working Group comprises some 60 external members from the fields of air science, health, green groups, academics, chambers of commerce, professional bodies (including urban planning experts) and relevant trades. Representatives from 10 government bureaux and departments ("B/Ds") such as the Development Bureau, Transport and Housing Bureau, Department of Health and Planning Department are also included, with the Environment Bureau and EPD as the lead B/D.

Marine Transportation, Energy and Power Generation, and Air Science and Health respectively were formed under the Working Group.³ In addition, EPD conducted a public engagement exercise and two public forums in 2017 to solicit public views.

7. The Administration completed the AQOs review in December 2018 and submitted the review report to ACE in February 2019. The results reveal that there are scopes for tightening AQOs for SO₂ and PM_{2.5} from Interim Target-1 to Interim Target-2 of WHO's AQGs as follows:

- (a) SO₂: the average 24-hour concentration limit stipulated in the AQOs could be tightened from 125µg/m³ at present to 50µg/m³, with the number of allowable exceedances (three times per year) unchanged; and
- (b) PM_{2.5}: the average 24-hour concentration limit stipulated in AQOs could be tightened from 75µg/m³ at present to 50µg/m³, with the number of allowable exceedances relaxed from the current level of not more than nine times to not more than 35 times per year; and the average annual concentration limit could be tightened from 35µg/m³ to 25µg/m³.

8. The Administration subsequently launched a three month public consultation on the review findings from 12 July to 11 October 2019. According to the Administration, subject to the views collected and consultation with ACE and the Panel on Environmental Affairs ("EA Panel"), the Administration will submit an amendment bill to LegCo if the AQOs are to be tightened.

Major views and concerns expressed by Members

9. On 30 March 2016, 26 June 2017 and 25 March 2019, the Administration briefed EA Panel on the work plan, progress and findings of the AQOs review respectively. During the examination of the Estimates of Expenditures in recent years, Members also enquired about issues relating to the AQOs review. The major views and concerns expressed by Members are summarized in the ensuing paragraphs.

³ The subgroups on Road Transportation, Marine Transportation, and Energy and Power Generation are to identify possible new air quality improvement measures under their respective areas and examine the practicability of their implementation within the timeframe up to 2025. The Air Science and Health subgroup examines the assessment of air quality improvements and health and economic impact arising from the possible measures, and hence the possible scope for further tightening AQOs.

Proposed changes to Air Quality Objectives for fine suspended particulates

10. Members expressed concerns about the proposed increase in the number of allowable exceedances for the 24-hour AQO for PM_{2.5}, i.e. from nine to 35 times, and queried whether this would in effect relax the standard and contribute little to further improving the local air quality or protecting public health.

11. Referring to the data collected by the air quality monitoring network between 2011 and 2017, the Administration advised that the proposed 24-hour AQO for PM_{2.5} was more stringent than the prevailing AQO despite the proposed increase in the number of allowable exceedances. During the said period, the ambient air quality monitoring network recorded 17 exceedances against the prevailing 24-hour AQO for PM_{2.5}, but 30 exceedances against the proposed one, reflecting that significant improvement to the local air quality had to be made in order to meet the proposed new AQO.

12. The Administration further explained that the proposed allowable exceedances would cater for non-compliance during pollution episodes caused by locally uncontrollable circumstances such as regional air pollution or extreme weather. This approach was in line with WHO's AQGs and had been adopted in other places such as EU where the number of allowable exceedances for the 24-hour PM₁₀ standard was set at 35 times per year. The Administration stressed that it would continue to implement existing and new measures to improve air quality and safeguard public health.

Pollution caused by high concentration of nitrogen dioxide and ozone

13. Members were concerned about the high NO₂ concentration and the rising trend in O₃ concentration in Hong Kong and enquired about the measures to tackle the problems. Some Members asked why the Administration had not proposed to tighten the AQO for O₃ under the current review.

14. The Administration responded that the major source of NO₂ at the roadside was tailpipe emissions from commercial vehicles, while O₃ was not directly emitted from air pollution sources but was formed by photochemical reactions of nitrogen oxides and volatile organic compounds ("VOCs") in the atmosphere, which were emitted from many different pollution sources in the region. Measures had been/would be implemented to reduce tailpipe emissions including tightening vehicle emission standards to Euro VI in phases, phasing out old diesel commercial vehicles through an incentive-cum-regulatory approach, and setting up low emission zones and requiring franchised bus companies to deploy only low-emission buses in the zones, etc.

15. The Administration also pointed out that while the above vehicle emission control measures would help reduce the concentrations of NO₂ and nitric oxide ("NO") and improve roadside air quality, the removal of O₃ would also be reduced due to the resulting less NO to react with O₃. Since air quality assessments showed that O₃ concentration in most parts of Hong Kong by 2025 would still exceed the next higher interim target levels stipulated by WHO, the Administration considered it impracticable to tighten the AQO for O₃ at this stage. However, it would explore tightening the AQO for O₃ in the next review.

Regional cooperation on improving air quality

16. Members sought information on regional cooperation on improving air quality, in particular the plans to deepen the cooperation following the announcement of the Outline Development Plan for the Guangdong-Hong Kong-Macao Greater Bay Area ("the Outline Development Plan").

17. The Administration advised that Hong Kong and the Mainland authorities drew up the Pearl River Delta Regional Air Quality Management Plan ("the Management Plan") in 2003 for, among other things, the implementation of air pollution control measures. The Management Plan was reviewed and updated from time to time. Looking forward, the Administration would strengthen cooperation with cities in the Guangdong-Hong Kong-Macao Greater Bay Area on improving air quality under the Outline Development Plan. One of the major initiatives was to strengthen joint preventive and control measures against O₃. To this end, the Administration would conduct a joint study with the mainland authorities to identify the key sources of VOCs contributing to the formation of O₃, with a view to devising suitable control measures.

Environmental impact assessment of works projects

18. Some Members questioned whether AQOs had become merely a benchmark for consideration of designated projects under the Environmental Impact Assessment ("EIA") process. Some other Members, however, were concerned about the possible impacts on such projects with the introduction of the proposed new AQOs, such as raising the threshold for granting environmental permits ("EPs") to works projects.

19. The Administration advised that apart from serving as a benchmark for consideration of designated projects under the EIA process, AQOs could also facilitate the assessment of the progress in air quality improvement. Adoption of the proposed new AQOs was expected to raise the standard for assessing the impacts of designated projects on air quality under EIAO and thus, the air pollution control on future designated projects would be strengthened accordingly.

20. The Administration acknowledged that the introduction of the proposed new AQOs would create certain constraints on the ongoing public works projects that had been granted with an EP based on the current AQOs. In the event that an amendment to the scope of such a project should warrant an application for variation of the EP, the application of the new AQOs might cause substantial changes to the original design of the project and have major cost and programming implications. In this connection, the Administration intended to provide a transitional period of 36 months if the proposed AQOs were to be implemented.

Council questions

21. At the Council meetings of 26 November 2014, 18 November 2015, 15 February 2017 and 30 January 2019, Hon Dennis KWOK, Hon CHAN Hak-kan, Hon Kenneth LEUNG and Hon CHU Hoi-dick raised questions relating to AQOs. The questions and the Administration's replies are hyperlinked in **Appendix II**.

Latest development

22. At the meeting on 16 December 2019, the Administration will brief EA Panel on the overall strategy for improving air quality, including an update on the development of the review of AQOs.

Relevant papers

23. A list of relevant papers is set out in **Appendix II**.

Appendix I

Prevailing Air Quality Objectives of Hong Kong

Pollutant	Averaging time	Concentration limit ($\mu\text{g}/\text{m}^3$)	Number of exceedances allowed
Sulphur dioxide ("SO ₂ ")	10-minute	500	3
	24-hour	125	3
Respirable suspended particulates ("PM10")	24-hour	100	9
	Annual	50	Not applicable
Fine suspended particulates ("PM2.5")	24-hour	75	9
	Annual	35	Not applicable
Nitrogen dioxide ("NO ₂ ")	1-hour	200	18
	Annual	40	Not applicable
Ozone ("O ₃ ")	8-hour	160	9
Carbon monoxide ("CO")	1-hour	30 000	0
	8-hour	10 000	0
Lead ("Pb")	Annual	0.5	Not applicable

Note: 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.

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

Review of Air Quality Objectives

List of relevant papers

Date	Event	Paper
1 April 2014	Special meeting of Finance Committee ("FC") for examination of Estimates of Expenditure 2014-2015	Written question raised by a Member and Administration's reply (Reply serial number: ENB292)
30 March 2015	Special meeting of FC for examination of Estimates of Expenditure 2015-2016	Written questions raised by Members and Administration's replies (Reply serial numbers: ENB071 , 091 , 130 , 164 , 276 , 280 and 307)
27 April 2015	Meeting of the Panel on Environmental Affairs ("EA Panel")	Administration's paper on "Progress of air quality improvement measures" (LC Paper No. CB(1)763/14-15(03)) Minutes of meeting (LC Paper No. CB(1)979/14-15)
30 March 2016	Meeting of EA Panel	Administration's paper on "Work Plan of the Review of Air Quality Objectives" (LC Paper No. CB(1)705/15-16(03)) Administration's follow-up paper (LC Paper No. CB(1)1010/15-16(02)) Minutes of meeting (LC Paper No. CB(1)969/15-16)
5 April 2017	Special meeting of FC for examination of Estimates of Expenditure 2017-2018	Written question raised by a Member and Administration's reply (Reply serial number: ENB110)

Date	Event	Paper
26 June 2017	Meeting of EA Panel	<p>Administration's paper on "Progress of the Review of Air Quality Objectives" (LC Paper No. CB(1)1164/16-17(07))</p> <p>Administration's follow-up paper (LC Paper No. CB(1)1373/16-17(02))</p> <p>Minutes of meeting (LC Paper No. CB(1)23/17-18)</p>
30 October 2017	Policy briefing cum meeting of EA Panel	Minutes of meeting (LC Paper No. CB(1)399/17-18)
17 April 2018	Special meeting of FC for examination of Estimates of Expenditure 2018-2019	Written question raised by a Member and Administration's reply (Reply serial number: ENB123)
22 October 2018	Policy briefing of EA Panel	Minutes of meeting (LC Paper No. CB(1)276/18-19)
19 December 2018	Meeting of EA Panel	<p>Administration's paper on "Progress on Improving Roadside Air Quality" (LC Paper No. CB(1)319/18-19(04))</p> <p>Administration's follow-up paper (LC Paper No. CB(1)537/18-19(02))</p> <p>Minutes of meeting (LC Paper No. CB(1)720/18-19)</p>
January 2019	Letter from Hon CHU Hoi-dick to EA Panel Chairman appealing for early discussion of matters relating to the review of Air Quality Objectives (Chinese version only) and EA Panel Chairman's reply (Chinese version only)	<p>Letter dated 1 January 2019 from Hon CHU Hoi-dick (LC Paper No. CB(1)482/18-19(01))</p> <p>EA Panel Chairman's written reply dated 17 January 2019 to Hon CHU Hoi-dick (LC Paper No. CB(1)482/18-19(02))</p>

Date	Event	Paper
25 March 2019	Meeting of EA Panel	<p>Administration's paper on "Review of Air Quality Objectives" (LC Paper No. CB(1)723/18-19(03))</p> <p>Administration's follow-up paper (LC Paper No. CB(1)16/19-20(01))</p> <p>Joint letter dated 18 March 2019 from Hon Kenneth LEUNG, Hon Dennis KWOK Wing-hang and Hon Tanya CHAN on review of Air Quality Objectives (Chinese version only) (LC Paper No. CB(1)753/18-19(01))</p> <p>Administration's response to the joint letter dated 18 March 2019 from Hon Kenneth LEUNG, Hon Dennis KWOK Wing-hang and Hon Tanya CHAN (LC Paper No. CB(1)770/18-19(01))</p> <p>Letter dated 26 March 2019 from Hon HUI Chi-fung on review of Air Quality Objectives (Chinese version only) (LC Paper No. CB(1)796/18-19(01))</p> <p>Administration's response to the letter dated 26 March 2019 from Hon HUI Chi-fung (LC Paper No. CB(1)15/19-20(01))</p> <p>Minutes of meeting (LC Paper No. CB(1)1155/18-19)</p>
9 April 2019	Special meeting of FC for examination of Estimates of Expenditure 2019-2020	<p>Written questions raised by Members and Administration's replies (Reply serial numbers: ENB083 and 297)</p>

Hyperlink to relevant document:

Organization	Document
World Health Organization	Air quality guidelines. Global update 2005. Particulate matter, ozone, nitrogen dioxide and sulfur dioxide

Hyperlinks to relevant Council Questions:

Date	Council Question
26 November 2014	Press release on Council question (oral) raised by Hon Dennis KWOK
18 November 2015	Press release on Council question (oral) raised by Hon CHAN Hak-kan
15 February 2017	Press release on Council question (written) raised by Hon Kenneth LEUNG
30 January 2019	Press release on Council question (oral) raised by Hon CHU Hoi-dick Press release on Council question (written) raised by Hon Kenneth LEUNG