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Panel on Environmental Affairs

Meeting on 22 May 2017

Background brief on measures to improve roadside air quality prepared by the Legislative Council Secretariat

Purpose

This paper provides background information on measures to improve roadside air quality in 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 2014-2015 to 2016-2017 legislative sessions.

Background

Air quality management in Hong Kong

Air Quality Objectives

2. The Government's overall policy objective for air quality management is to achieve as soon as practicable and to maintain thereafter an acceptable level of air quality to safeguard the health and well-being of the community, and to promote the conservation and best use of air in public interest. In this regard, the Air Pollution Control Ordinance ("APCO") (Cap. 311) was enacted to stipulate the Air Quality Objectives ("AQOs") of Hong Kong, which relate to seven key air pollutants.[1] The prevailing AQOs came into effect on 1 January 2014.[2]

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[1] The seven key air pollutants are sulphur dioxide, respirable suspended particulates, fine suspended particulates, nitrogen dioxide, ozone, carbon monoxide, and lead.

Clean Air Plan for Hong Kong

3. In March 2013, the Environment Bureau released "A Clean Air Plan for Hong Kong" ("Clean Air Plan") to outline comprehensively the challenges Hong Kong is facing with regard to air quality and to give an overview of the relevant air quality improvement policies and measures. In the area of reducing roadside air pollution, Clean Air Plan sets out a number of measures aiming to control tailpipe emissions, improve road conditions and reduce traffic congestions, and enhance urban planning to reduce the "street canyon" effect.[3]

Improving roadside air quality

4. Tailpipe emissions are the key source of roadside air pollution, and diesel commercial vehicles ("DCVs") and buses are the main contributors to tailpipe emissions.[4] To improve roadside air quality, the Government has been implementing a host of measures to control vehicular emissions and encourage the adoption of green transport technologies. A summary of the key measures are in the ensuing paragraphs.

Tightening of emission standards for newly registered vehicles

5. The Government has been tightening vehicle emission standards with reference to international developments and the supply of compliant vehicles in Hong Kong. In February 2017, the Air Pollution Control (Vehicle Design Standards) (Emission) (Amendment) Regulation 2017 ("Amendment Regulation") was introduced to implement in phases the Euro VI emission standards in Hong Kong for newly registered vehicles (except diesel private cars, buses of design weight not more than 9 tonnes, light buses of design weight more than 3.5 tonnes, motor cycles and tricycles); and to tighten the emission standards for newly registered diesel private cars to California

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[2] APCO stipulates that AQOs must be reviewed at least once every five years. The Administration is conducting a review on AQOs, and has formed an AQO Review Working Group to gather views via dedicated sub-groups on four key aspects, namely road transportation, marine transportation, air science and health, and energy and power generation. It is expected that the review will be completed in mid-2018.

[3] One of the contributing factors to roadside air pollution is the increase in closely-spaced high-rise buildings on both sides of relatively narrow, busy roads, which trap vehicular emissions and create the "street canyon" effect.

[4] In 2014, emissions from diesel vehicles (including goods vehicles, buses and light buses) constituted about 97% and 78% of total vehicular respirable suspended particulate and nitrogen oxide emissions respectively.

LEV III.[5] The Amendment Regulation will come into operation from 1 July 2017.

Phasing out pre-Euro IV diesel commercial vehicles

6. The Environmental Protection Department ("EPD") launched an incentive-cum-regulatory scheme in March 2014 to phase out by the end of 2019 some 82 000 pre-Euro IV DCVs (accounting for about 60% of the DCV fleet). Under the scheme, an ex-gratia payment up to 33% of the average taxable values of new vehicles is offered to eligible vehicle owners for phasing out their pre-Euro IV DCVs.[6]

Strengthening emission control of liquefied petroleum gas and petrol vehicles

7. Since September 2014, the emission control of liquefied petroleum gas ("LPG") and petrol vehicles have been strengthened by deployment of roadside remote sensing equipment to screen out vehicles with excessive emissions. Vehicles caught will have to pass within 12 working days a dynamometer-based emission test to confirm rectification of the excessive emission problem. Failure to comply may lead to cancellation of the vehicle licence.

Low emission zones and retrofitting of Euro II and Euro III buses

8. Three low emission zones ("LEZs") have been set up in busy corridors in Central, Causeway Bay and Mong Kok since 2015. Franchised bus companies are required to deploy low-emission buses to ply the routes passing these LEZs.[7] At the same time, franchised bus companies are fully subsidized to retrofit eligible Euro II and III buses with selective catalytic reduction devices to upgrade their emission performance.

Promoting the use of green transport technologies

9. To encourage vehicle buyers to choose electric vehicles ("EVs") instead

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[5] The Euro VI emission standards will take effect in phases starting from 1 July 2017, and the California LEV III emission standards for diesel private cars will commence on 1 October 2017.

[6] The ex-gratia payment application deadlines for four types of DCVs are as follows: (a) Pre-Euro: 31 December 2015; (b) Euro I: 31 December 2016; (c) Euro II: 31 December 2017; and (d) Euro III: 31 December 2019. As at the end of April 2017, some 52 300 DCVs (i.e. about 64% of the eligible vehicles) have been retired under the scheme.

[7] Low-emission buses include buses of Euro IV or above, or Euro II and III buses retrofitted with selective catalytic reduction devices and diesel particulate filters.

of conventional ones, the first registration tax ("FRT") for EVs was waived in full from April 1994 to 31 March 2017. From 1 April 2017 to 31 March 2018, the FRT concession for electric private cars is capped at $97,500, while the full FRT waiver for electric commercial vehicles is maintained. The Government is also offering an FRT concession scheme for environment-friendly commercial vehicles, with FRT waiver ranging from 30% to 100% depending on vehicle class. Enterprises having procured environment-friendly vehicles are allowed to have 100% profits tax deduction for capital expenditures on the vehicles in the first year of procurement from June 2010 onwards.

10. The Pilot Green Transport Fund ("PGTF") was set up in March 2011 with $300 million to encourage the public transport sector and non-profit organizations to test out green and innovative transport technologies. The Fund subsidizes the capital cost of the relevant hardware, and is applicable to taxis, buses, light buses, goods vehicles and ferries.[8]

11. Franchised bus companies have been fully subsidized to procure six double-deck hybrid buses and 36 single-deck electric buses for trial. All the hybrid buses have been in operation since late 2014. The first batch of five electric buses have been in operation since December 2015 while the remaining ones will be put into service progressively in 2017.

Major views and concerns expressed by Members

12. The Panel on Environmental Affairs ("EA Panel") discussed measures to improve roadside air quality at a number of meetings from 2014-2015 to 2016-2017. Relevant issues were also brought up at meetings of the Subcommittee on Air Pollution Control (Vehicle Design Standards) (Emission) (Amendment) Regulation 2017.[9] The major views and concerns expressed by Members are summarized in the ensuing paragraphs.

Effectiveness of measures to improve roadside air quality

13. Members sought details of the effectiveness of the measures to improve roadside air quality. The Administration advised that the roadside levels of nitrogen dioxide, respirable suspended particulates and fine suspended particulates were reduced by 31%, 28% and 28% respectively from 2012 to 2016. As regards quantification of the health risk reduction, the Administration

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[8] As at the end of March 2017, PGTF has approved 94 trials with a total subsidy of about $86 million.

[9] The Subcommittee was formed by the House Committee to scrutinize the legislative proposal to implement the Euro VI and California LEV III emission standards.

had commissioned the Chinese University of Hong Kong to develop a methodology suitable for evaluating and quantifying the adverse health outcomes of air pollution and their associated costs. Findings of the study would be reported to EA Panel in due course and would be considered in the AQO Review.

First registration tax concession for electric private cars

14. Some Members expressed grave concern that the FRT concession cap for electric private cars would drive buyers to choose conventional private cars and undermine other efforts to promote the adoption of EVs with a view to improving roadside air quality. At the meeting on 27 February 2017, EA Panel passed a motion requesting the Administration to maintain the full FRT waiver for electric private cars.

15. The Administration responded that its policy was to promote the use of public transport to achieve the dual purpose of reducing road traffic congestion and improving air quality. FRT waiver for EVs was intended to reduce the price premium between EVs and conventional vehicles, and to support the adoption of EV technologies in Hong Kong. As mid-priced electric private cars that could satisfy ordinary transport needs had become more common in Hong Kong in recent years, the Administration considered it appropriate to reduce the FRT waiver for electric private cars as recently implemented. The Administration would review the FRT waiver arrangement regularly having regard to the prevailing market conditions.

Charging facilities for electric vehicles

16. Members urged the Administration to expeditiously expand the public EV charging network in the territory to facilitate wider adoption of EVs, as well as to consider drawing up a set of official charging standards for EVs and introducing metered parking spaces on roadside that supported EV charging for exclusive use by EVs.

17. The Administration pointed out that the main obstacle to increasing public charging facilities was the lack of a universal standard for the chargers. Since it was not feasible to install all types of chargers at a charging place, some EV users might find the distribution of public charging facilities inadequate. The problem could only be resolved gradually as the international market for EVs developed.

Adoption of green vehicle by transport trades

18. Members expressed disappointment about the slow growth in the number of licensed electric commercial vehicles, and asked about the

effectiveness of PGTF in promoting the use of electric/hybrid vehicles by the transport trades. The Administration advised that commercial adoption of EVs was still constrained by factors including long charging time, low energy density, heavy weight and high cost of EV batteries, as well as limited choices of electric commercial vehicle models in the market. These problems could only be resolved in the long run by advancement of EV technologies. The Administration had made electric light goods vehicles a key focus of promotion of PGTF because light goods vehicles generally did not operate round the clock and might have a lower daily mileage and lighter payload. The Administration had also stepped up efforts to promote the trial of hybrid vehicles under PGTF. It was observed that the transport trades had less reservation about using hybrid commercial vehicles since these vehicles could operate using diesel and their batteries did not need external charging.

Ex-gratia payments for phasing out pre-Euro IV diesel commercial vehicles

19. In view of the higher prices of Euro VI DCVs compared to their Euro V counterparts, and the prospective implementation of the Euro VI emission standards, some Members considered that the Administration should increase the ex-gratia payments under the existing scheme to phase out pre-Euro IV DCVs, or put in place another scheme to encourage the transport trades to switch to Euro VI models early. The Administration explained that the ex-gratia payment levels in question were inversely correlated with the age of the vehicle to be retired to give extra impetus for vehicle owners to take action earlier, and the levels would remain the same throughout the scheme period. An ex-gratia payment was payable irrespective of whether a new vehicle was bought as replacement. Raising the ex-gratia payment levels would be unfair to those who had already retired their DCVs under the scheme.

Trial of electric buses

20. Members enquired about the progress of the trial of electric buses and whether the Administration had set any targets and implementation timetable in respect of the use of zero-emission buses. The Administration responded that it had fully subsidized franchised bus companies to procure 36 single-deck electric buses for trial, and some non-franchised bus companies had also been testing electric buses. The performance of electric buses under trial was unsatisfactory given their frequent breakdowns and the long charging time. As for double-deck electric buses, there had yet to be a ready supply of suitable models for trial in Hong Kong.

Council questions

21. In the 2016-2017 legislative session, Hon Jimmy NG, Hon Frankie YICK and Hon Kenneth LEUNG raised questions at Council meetings on the implementation of strengthened emission control of LPG and petrol vehicles, measures to promote environment-friendly vehicles, and effectiveness of measures to reduce emissions from different pollution sources including road transport. The questions and the Administration's replies are hyperlinked in the **Appendix**.

Latest development

22. The Administration will brief EA Panel on the latest progress of improving roadside air quality at the meeting on 22 May 2017.

Relevant papers

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

Council Business Division 1
Legislative Council Secretariat
16 May 2017

Appendix

Measures to improve roadside air quality

List of relevant papers

Date	Event	Paper
26 January 2015	Policy briefing cum meeting of the Panel on Environmental Affairs ("EA Panel")	Administration's paper on "2015 Policy Address – Policy initiatives of Environment Bureau: Environmental protection" (LC Paper No. CB(1)436/14-15(01)) Minutes of meeting (LC Paper No. CB(1)674/14-15)
23 March 2015	EA Panel meeting	Administration's paper on "Progress of setting up of Low Emission Zones" (LC Paper No. CB(1)652/14-15(04)) Minutes of meeting (LC Paper No. CB(1)847/14-15)
27 April 2015	EA Panel meeting	Administration's paper on "Progress of air quality improvement measures" (LC Paper No. CB(1)763/14-15(03)) Minutes (LC Paper No. CB(1)979/14-15)
21 July 2015	EA Panel meeting	Administration's paper on "Progress report on the Pilot Green Transport Fund" (LC Paper No. CB(1)1113/14-15(01)) Minutes of meeting (LC Paper No. CB(1)1270/14-15)
26 October 2015	EA Panel meeting	Administration's paper on "Progress of phasing out pre-Euro IV diesel commercial vehicles" (LC Paper No. CB(1)37/15-16(03)) Minutes of meeting (LC Paper No. CB(1)247/15-16)

Date	Event	Paper
25 January 2016	Policy briefing cum meeting of EA Panel	Administration's paper on "2016 Policy Address – Policy initiatives of Environment Bureau: Environmental protection" (LC Paper No. CB(1)459/15-16(03)) Minutes of meeting (LC Paper No. CB(1)739/15-16)
30 March 2016	EA Panel meeting	Administration's paper on "Work Plan of the Review of Air Quality Objectives" (LC Paper No. CB(1)705/15-16(03)) Administration's paper on "Interim Findings of the Trial of Hybrid Franchised Buses" (LC Paper No. CB(1)705/15-16(05)) Minutes of meeting (LC Paper No. CB(1)969/15-16)
19 December 2016	EA Panel meeting	Administration's paper on "Proposals to Tighten Emission Standards for Newly Registered Vehicles" (LC Paper No. CB(1)295/16-17(06)) Minutes of meeting (LC Paper No. CB(1)504/16-17)
23 January 2017	Policy briefing cum meeting of EA Panel	Administration's paper on "2017 Policy Address – Policy initiatives of Environment Bureau: Environmental protection" (LC Paper No. CB(1)451/16-17(01)) Minutes of meeting (LC Paper No. CB(1)683/16-17)
24 February 2017	Special meeting of EA Panel	Administration's paper on "Proposals to Tighten Emission Standards for Newly Registered Vehicles" (LC Paper No. CB(1)295/16-17(06)) Minutes of meeting (LC Paper No. CB(1)882/16-17) (to be confirmed at the meeting on 22 May 2017)

Date	Event	Paper
27 February 2017	EA Panel meeting	Administration's paper on "Promoting the Use of Electric Vehicles" (LC Paper No. CB(1)574/16-17(04)) Minutes of meeting (LC Paper No. CB(1)783/16-17)
March 2017	Subcommittee on Air Pollution Control (Vehicle Design Standards) (Emission) (Amendment) Regulation 2017	Legislative Council Brief (EP150/L1/3) Legal Service Division Report (LC Paper No. LS34/16-17) Report of the Subcommittee (LC Paper No. CB(1)751/16-17)

Hyperlink to relevant document:

Government bureau	Document
Environment Bureau	A Clean Air Plan for Hong Kong

Hyperlinks to relevant Council Questions:

Date	Council Question
16 November 2016	Press release on Council question (written) raised by Hon Jimmy NG
14 December 2016	Press release on Council question (oral) raised by Hon Frankie YICK
15 February 2017	Press release on Council question (written) raised by Hon Kenneth LEUNG