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Panel on Environmental Affairs

Meeting on 27 February 2012

**Background brief on the proposal to strengthen the control of
emissions of petrol and liquefied petroleum gas vehicles
prepared by the Legislative Council Secretariat**

Purpose

This paper sets out the background to the proposal to strengthen the control of emissions of petrol and liquefied petroleum gas (LPG) vehicles, and to provide a one-off subsidy for owners of LPG taxis and light buses to replace the catalytic converters in their vehicles. The paper also gives an account of the views expressed by Members on the subject.

Background

2. The Administration has taken various actions to improve roadside air quality. These include tightening the standards for motor vehicle fuels and the emissions of newly registered vehicles, introducing LPG vehicles to replace diesel taxis and light buses, mandating all pre-Euro diesel vehicles to be retrofitted with particulate reduction devices, upgrading the standard and test procedures for vehicle smoke emissions, launching incentive schemes to encourage the use of environment-friendly vehicles and replacement of pre-Euro III diesel commercial vehicles.

3. These actions have brought discernable air quality improvement at the roadside. Over the period from 1999 to 2010, the roadside air quality monitoring stations registered a reduction of 63% in the level of sulphur dioxide (SO₂) and 34% in respirable suspended particulates (RSP). However, the level of nitrogen dioxide (NO₂) rose by 20% in the period, causing a threefold increase in the number of days with "very high" Air Pollution Index (API) from 43 days in 2005 to 139 days in 2010. Roadside NO₂ is emitted directly by vehicles (i.e. primary emission) or formed after the further oxidation of the

nitric oxide (NO) emitted also by vehicles (i.e. via a secondary formation route involving volatile organic compounds and ozone).

4. Petrol and LPG vehicles that lack proper maintenance are a major source of roadside NO₂ emissions. These vehicles rely on catalytic converters to reduce emissions. However, catalytic converters will be worn out over use and need to be replaced from time to time, failing which will increase the exhaust emissions (including nitrogen oxides (NO_x) i.e. both NO and NO₂) of the vehicles by at least 10 times more than their normal levels. In general, LPG taxis and light buses should replace their catalytic converters in every 18 months, while petrol private cars in eight or more years owing to much lower mileage. Currently, 80% of LPG taxis and 45% of LPG light buses are emitting excessively due to defective catalytic converters. The emissions of LPG taxis and light buses account for about 39% and 55% of the total vehicular NO_x and hydrocarbon emissions at busy roads in urban area.

Measures to tackle roadside NO₂ problem

5. To tackle the roadside NO₂ problem, the Administration has conducted trial to retrofit Euro II and Euro III franchised buses with selective catalytic reduction devices to reduce their NO_x emissions and pave the way for subsidizing franchised bus operators to undertake the retrofit. Following the completion of a one-off grant to encourage the early replacement of pre-Euro and Euro I diesel commercial vehicles, a similar one-off grant scheme has been launched for Euro II diesel commercial vehicles. In parallel, the Administration is working jointly with the relevant Guangdong authorities on the post-2010 emission reduction arrangement for the Pearl River Delta region with a view to tackling, inter alia, the regional ozone and other air quality problems.

6. To strengthen the control of emissions from petrol and LPG vehicles, the Chief Executive announced in his 2011-12 Policy Address a package of measures targeting at vehicles that are not properly maintained. These include using remote sensing equipment and advanced emission tests to screen out in-use petrol and LPG vehicles that emit excessively, and setting aside \$150 million for providing a one-off subsidy to owners of LPG taxis and light buses to replace their catalytic converters.

The Proposal

7. To strengthen the control of emissions from petrol and LPG vehicles, the Administration proposes to -

- (a) use roadside remote sensing equipment to screen out in-use petrol

and LPG vehicles that emit excessively, and require their owners to rectify their excessive emission problem;

- (b) require those vehicles screened as emitting excessive emission to pass an advanced emission test¹ done with the aid of a chassis dynamometer at a designated emission test centre within 12 working days for ascertaining the rectification of the excessive emission problem, and cancel the licences of those vehicles failing to comply with the requirements. The vehicle owner will have to pay the emission test fee, which is currently set at \$310 as stipulated in Schedule 10 of the Road Traffic Ordinance; and
- (c) set aside \$150 million for providing a one-off subsidy to help owners to replace the catalytic converters and associated components of their LPG taxis and light buses before the implementation of the proposed emission control measures.

8. Consultation on the proposal was launched on 15 November 2011 and ended on 15 January 2012. Subject to the outcome of the consultation, the Administration plans to seek funding approval from the Finance Committee in the second quarter of 2012 for launching the replacement of catalytic converters and associated components for LPG taxis and light buses in the latter half of 2012. The plan is to start in early 2013 the deployment of roadside remote sensing equipment to screen out those in-use petrol and LPG vehicles emitting excessively for their owners to take repair actions. The advanced emission test and the proposed emission limits will be incorporated into the annual inspection for the licence renewal of petrol and LPG vehicles.

Deliberations by the Panel on Environmental Affairs

9. The proposal to strengthen the control of emissions of petrol and LPG vehicles was discussed by the Panel on Environmental Affairs (the Panel) at its meeting on 28 November 2011.

10. Given that LPG taxis had been introduced some 10 years ago, some Panel members expressed concern about the problem of excessive emissions of older LPG vehicles. Some other members considered that with the emergence of newer and cleaner vehicles, there might not be a need for continued reliance on the use of LPG vehicles as taxis and light buses. Instead of providing a one-off subsidy to help owners to replace the catalytic converters and associated components of their LPG taxis and light buses, consideration should be given to introducing electric taxis, as in the case of Shenzhen. Besides, owners of LPG

¹ The emission limits will be set at two times the corresponding vehicle emission design standards to allow for increase in vehicle emissions due to normal vehicle engine aging and the associated wear and tear of mechanical parts.

taxis and light buses would have to pay for subsequent replacement of catalytic converters which only had a service life of about 18 months. A member pointed out that some research findings had revealed that the retrofitting of catalytic converters might have the effect of increasing the emissions of NO₂ from vehicles.

11. Some Panel members were skeptical about the effectiveness of roadside remote sensing equipment in screening out in-use petrol and LPG vehicles that emit excessively given the busy traffic in Hong Kong. As the roadside remote sensing equipment could only be used to check vehicles in single lane traffic, these members questioned its applicability in Hong Kong given the limited number of roads with single lane traffic. To ascertain the reliability of roadside remote sensing equipment, some other members suggested conducting a field visit to observe the pilot testing of the equipment.

Council questions

12. Hon Audrey EU raised a question on the control of emissions from LPG vehicles at Council meeting on 21 November 2007. Details of the Council question are hyperlinked below for ease of reference.

Latest development

13. The Administration proposes to report the findings of the consultation to the Panel on 27 February 2012.

Relevant papers

14. A list of relevant papers is in the **Appendix**.

Appendix

A proposal to strengthen the control of emissions of petrol and liquefied petroleum gas vehicles

List of relevant papers

Council/ Committee	Date of meeting	Paper
EA Panel	28 November 2011	<p>Information paper on "A Proposal to Strengthen the Control of Emissions of Petrol and Liquefied Petroleum Gas Vehicles" provided by the Administration (LC Paper No. CB(1) 353/11-12(01)) http://www.legco.gov.hk/yr11-12/english/panels/ea/papers/ea1128cb1-353-1-e.pdf</p> <p>Minutes of meeting (LC Paper No. CB(1) 853/11-12) http://www.legco.gov.hk/yr11-12/english/panels/ea/minutes/ea20111128.pdf</p>

Hyperlinks to relevant Council Questions:

Date	Council Questions
21 November 2007	<p>Council question raised by Hon Audrey EU http://www.info.gov.hk/gia/general/200711/21/P200711210199.htm</p>