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Our Ref: (13) in EP11/V1/102/8 Part 2 **Environmental Protection Department**

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Senior Council Secretary  
Council Business Division 1  
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Legislative Council Complex,  
1 Legislative Council Road, Central  
Hong Kong  
(Attn: Ms Angel SHEK)

4 January 2016

Dear Ms SHEK,

**Panel on Environmental Affairs (EA)**  
**List of follow-up actions**

When discussing “Proposal to tighten emission standards of newly registered vehicles” at the meeting on 27 November 2015, Members requested the Administration to provide supplementary information. Please find our response at the **Annex**.

If you have any query, please contact the undersigned on 2594 6301.

Yours sincerely,

(KW Fong)

for Director of Environmental Protection

Encl.

a) **supplementary information, apart from those given in paragraphs 16 to 19 of the Administration's paper (LC Paper No. CB(1)180/15-16(03), on the maintenance of Euro VI vehicles, including the training for the local vehicle maintenance trade, availability of the vehicle maintenance services to the public, and the maintenance cost.**

Euro VI diesel vehicles rely on emission control technologies such as Exhaust Gas Recirculation (EGR) and Selective Catalytic Reduction (SCR) to control emission of nitrogen oxides and Diesel Particulate Filter (DPF) to control particulates. As these technologies have already been used in Euro IV and V diesel vehicles, they should not be new to vehicle mechanics. To help vehicle mechanics master the latest skill to maintain diesel vehicles, the Vocational Training Council (VTC) has been offering regular training courses since 2012 when Euro V became the statutory emission standard for vehicles newly registered in Hong Kong.

In addition, the Environmental Protection Department (EPD) has been organizing seminars for the vehicle repair trade in collaboration with VTC, vehicle manufacturers, the Hong Kong Commercial Vehicle Maintenance Association and other relating bodies to disseminate the latest vehicle maintenance information. From April to December 2015, we organized three seminars and the last one was held on 27 November 2015 attended by about 350 people. The Hong Kong Commercial Vehicle Maintenance Association finds that these seminars useful. We will continue to hold these seminars and will work together with the co-organizers to make the seminars more useful for the vehicle repair trade.

Furthermore, Euro VI emission standard also has a requirement for vehicle manufacturers to make available vehicle maintenance information though a cost may apply. We will include this requirement when upgrading the statutory vehicle emission standards to Euro VI by amending the Air Pollution Control (Vehicle Design Standards) (Emission) Regulations (Cap. 311 sub. leg. J).

Some vehicle suppliers have offered maintenance packages for their Euro VI vehicles which are more favourable than those for their Euro V vehicles. It appears that maintenance costs of Euro VI vehicles are not significantly different from those of Euro V ones.

**b) in the light of the European Commission's plan to introduce Real Driving Emission test procedures for assessing the emission performance of Euro VI vehicles on road, the corresponding implementation plan in Hong Kong.**

To ensure the consistency of emission performance of vehicles when running on roads and tested in laboratories, the European Union (EU) has progressively incorporated Real Driving Emissions (RDE) tests into Euro VI standard. To date, EU has started implementing RDE tests for heavy duty vehicles (design weight above 3.5 tonnes). It will announce the detailed requirements for light duty vehicles at a later stage for implementation from September 2019<sup>1</sup>.

We will adopt the above RDE test requirement when upgrading the emission standard for newly registered vehicles to Euro VI. In essence, when Euro VI standard is in force, we will only allow vehicles that comply with the emission requirement in a certification laboratory as well as the RDE requirement to first register in Hong Kong.

**c) statistics on the emission of fine particles (i.e. PM<sub>2.5</sub>) from Euro VI light duty petrol vehicles that are equipped with direct injection engines, and an impact analysis (with "best case" and "worst case" scenarios and different assumptions of weather conditions) of the envisaged increase in the number of such vehicles in Hong Kong on local air quality (e.g. concentrations of PM<sub>2.5</sub> in the air) by district including Tung Chung.**

Based on various studies conducted by local academics for EPD, the regional contribution to our ambient suspended particulate concentrations could be some 60% on an annual basis, and the proportion could rise to some 70% during winter. To tackle the particulates problem, the Government has been working with Guangdong Provincial Government on a regional air quality management plan with a view to reducing four key air pollutants emissions in the PRD region including suspended particulates. These involve efforts to reduce emissions from power plants, factories and motor vehicles. The efforts have borne fruits. From 2005 to 2014, our annual PM<sub>2.5</sub> levels were reduced on average by 29% at our ambient air quality monitoring stations and by 33% at the roadside stations. Details are at the **Annex**.

To control PM<sub>2.5</sub> emissions from diesel private cars, Euro V emission standards have also required these cars to comply with a Particle Number (PN) limit. In recent years, direct injection petrol engines are gaining popularity in Europe because of

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<sup>1</sup> Source: [http://europa.eu/rapid/press-release\\_IP-15-5945\\_en.htm](http://europa.eu/rapid/press-release_IP-15-5945_en.htm)

better fuel economy and some Japanese vehicles manufacturers have also started developing such engines. Similarly, the number of direct injection petrol vehicles in Hong Kong is on the rise but we do not have their numbers.

Direct injection petrol engines could emit a substantive amount of PM<sub>2.5</sub> alike the diesel engines. To reduce their PM<sub>2.5</sub> emissions, EU thus introduced in Euro VI a PN limit for this type of petrol vehicles as in the case of their diesel counterparts. With this PN limit and RDE requirements to further control on-road emissions of vehicles, petrol vehicles should remain an insignificant PM<sub>2.5</sub> emission source.

Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Average	48	47	45	43	41	39	37	35	33	31	29	27	25	23	21	19	17	15	13
Hong Kong																			
City																			
Canary																			
Central																			
Average (Roadside)	48	47	45	43	41	39	37	35	33	31	29	27	25	23	21	19	17	15	13

Source: (1) Difference between 2012 and 2014  
 (2) Difference between 2011 and 2013  
 (3) Difference between 2011 and 2014  
 Shaded boxes denote "not included" or "not reported".  
 \* - denotes insufficient data for the calculation.  
 From Main Air Quality Monitoring Station is not included because it started operation in December 2017 and there was insufficient valid data for the calculation in 2014.

**Annex**

**Annual PM<sub>2.5</sub> concentrations (µg/m<sup>3</sup>) from 2005 to 2014**

EPD's Air Quality Monitoring Stations	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Change between 2005 and 2014 (%)
<b>a. Ambient Stations</b>											
Central/Western								29	33	28	-3% <sup>(1)</sup>
Eastern							30	25	28	-	-7% <sup>(2)</sup>
Kwai Chung								29	32	28	-3% <sup>(1)</sup>
Kwun Tong								28	33	31	11% <sup>(1)</sup>
Sham Shui Po								28	31	33	18% <sup>(1)</sup>
Tsuen Wan	43	41	41	37	32	30	35	29	31	28	-35%
Sha Tin								26	29	25	-4% <sup>(1)</sup>
Tai Po								28	-	27	-4% <sup>(1)</sup>
Tung Chung	40	40	39	37	30	29	32	28	26	24	-40%
Yuen Long	42	43	43	41	33	32	36	29	37	35	-17%
Tap Mun	38	34	38	35	28	26	31	25	30	27	-29%
Average (General)	41	40	40	38	31	29	33	28	31	29	-29%
<b>b. Roadside Stations</b>											
Central	48	47	45	41	35	36	39	33	34	28	-42%
Causeway Bay								42	45	38	-10% <sup>(1)</sup>
Mong Kok							37	32	33	31	-16% <sup>(3)</sup>
Average (Roadside)	48	47	45	41	35	36	38	36	37	32	-33%

Note:

(1) % difference between 2012 and 2014

(2) % difference between 2011 to 2013

(3) % difference between 2011 to 2014

Shaded boxes denote "Year in which PM<sub>2.5</sub> was not measured".

"-" denoted insufficient valid data for the calculation

Tuen Mun Air Quality Monitoring Station is not included because it started operation in December 2013 and there was insufficient valid data for the calculation in 2014