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(Attn: Ms. Angel Shek)

20 March 2017

Dear Ms. Shek,

**Subcommittee on Air Pollution Control (Vehicle Design Standards)  
(Emission)(Amendment) Regulation 2017**

**Response to Members' Enquiries  
at the meeting on 7 March 2017**

Please find in the Annex our response to Members' enquiries at the meeting on 7 March 2017.

If you have any queries, please contact the undersigned on 2594 6401.

Yours sincerely,

(Dave Ho)

for Director of Environmental Protection

Encl.

**Response to Members' Enquiries  
At the Subcommittee Meeting on 7 March 2017**

**Emission standards for diesel private cars**

*On the tightening of the emission standards for newly registered diesel private cars from California LEV II to LEV III and not allowing first registration of diesel private cars that can pass the statutory emission test for petrol private cars (i.e. Euro VI) starting from 1 July 2017, the Administration is requested to:*

*(a) clarify the policy objectives of tightening the emission standards for diesel private cars, and whether the objectives include controlling the number of diesel private cars, discouraging members of the public from purchasing diesel private cars, and containing overall vehicle growth in Hong Kong;*

Diesel private cars generally emit more nitrogen oxides (NO<sub>x</sub>) and Respiratory Suspended Particulates (RSP) than petrol cars. Since 1998, the Government has a standing policy to adopt the most stringent emission standards to discourage registration of these vehicles and has adopted the emission standards of the California of the United States (US) for diesel private cars in our statute. We subsequently tightened the standards from LEV I to LEV II in 2006, following the tightening by the State of California. In 2015, the State of California further tightened its vehicle emission standards to LEV III. We have thus proposed to make the same tightening under the Air Pollution Control (Vehicle Design Standards) (Emission) (Amendment) Regulation 2017. The tightening of emission standards for diesel private cars is not a means to control the overall growth of the local private car fleet. Car buyers could still choose petrol or electric cars, which would not cause as much roadside air pollution as diesel private cars.

*(b) provide a comparison of the different emission standards (i.e. Euro V, Euro VI, California LEV II and California LEV III) for diesel private cars, including the emission limits of various pollutants, testing procedures and other major requirements of the standards;*

In comparing the stringency of two different sets of vehicle emission

standards, we will have to take account not only of the emission limits, but also the way that the test vehicle is driven during the test (i.e. the test cycle or the test regime), the durability requirements for the emission control equipment, in-service performance verification, etc. The European Parliament<sup>[1]</sup> completed a study in December 2016 comparing the regulatory frameworks in the European Union (EU) and in the United States (US) for the emissions of vehicles. Its key findings are as follows –

- (i) the US federal standards are more ambitious for key local air quality pollutants, **particularly nitrogen oxides (NOx)**, than EU standards. In addition, California, and a number of other US states which chose to adopt California’s standards, apply emission standards which are more ambitious than US federal standards; and
- (ii) the EU’ s current test regime has hampered the effectiveness of emission standards. Not only is there a gap between test cycle emissions and real-world driving emissions, but the gap has been growing significantly over time.

On top of a more stringent test regime, the NOx emission limit for diesel private cars of LEV II and III is 46% lower than that of Euro 6 and hence more stringent, thereby reducing pollution and improving roadside air quality. Furthermore, the California LEV III standard imposes a durability requirement<sup>[2]</sup> 1.5 times more stringent than that of Euro 6. The emission limits for private cars under Euro 5, Euro 6, California LEV II and California LEV III are in **Appendix 1**.

*(c) provide a summary of the findings of major research/studies, if any, conducted by overseas jurisdictions and/or internationally recognized institutions, on the emission performance of California LEV III-compliant diesel private cars in real-world driving vis-à-vis laboratory tests;*

We are not aware of any major studies comparing the emission performance of LEV III diesel private cars in real-world driving vis-à-vis laboratory tests. However, as far as we know, the California Air Resources Board (CARB) has been relying on a robust motor vehicle emission control program including extensive certification requirements for new vehicles,

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<sup>1</sup> Martin Nesbit et. al. “Comparative Study on the Differences between the EU and US Legislation on Emissions in the Automotive Sector”, European Parliament. December 2016

<sup>2</sup> The vehicles shall comply with the emission limits for a distance which represents their useful life.

in-use requirements that apply to the life period of vehicles operating on the road, and enforcement against manufacturers who do not comply with these requirements. Its LEV III emission standard for diesel private cars is regarded as more stringent than the corresponding Euro VI standard as evidenced in the findings of the study of the European Parliament quoted in the reply to (b)

***(d) with analysis of the major arguments in the international context which are respectively in favour of and against the use of diesel private cars (such as the relevant impacts on public health, environment and climate change), explain why it is justified to adopt the more stringent California LEV III standards instead of Euro VI for these vehicles in Hong Kong; and***

The major environmental concerns against the use of diesel private cars are their excessive emissions of NO<sub>x</sub> and particulate matters (PM), including PM<sub>10</sub> and PM<sub>2.5</sub>. The two are key roadside air pollutants in Hong Kong as well as other cities. They will lead to or aggravate respiratory diseases. Children with asthma and older people with heart disease are most vulnerable. While modern diesel private cars have substantially reduced their PM emissions, their NO<sub>x</sub> emissions remain a major problem. Some European cities (such as London and Paris) that are facing the challenge to meet the ambient nitrogen dioxide (NO<sub>2</sub>) limit recommended by the World Health Organization attribute the problem to the large presence of diesel private cars in their cities.

In Hong Kong, the roadside NO<sub>2</sub> level has only been reduced by 17% as compared with 1999 with its level (82 ug/m<sup>3</sup>) more than 2 times the corresponding limit in the Air Quality Objectives (40 ug/m<sup>3</sup>). We are facing a huge challenge to further reduce the roadside NO<sub>2</sub> level. The high level of NO<sub>x</sub> emissions of diesel private cars during real-world driving will continue to pose significant risk to roadside air quality, particularly the NO<sub>2</sub> levels, unless the growth of the diesel car fleet is reined in.

Diesel private cars were promoted in the past for their better fuel efficiency than petrol ones, which would reduce the greenhouse gas (GHG) emission from the transport sector. However, an increasing number of cities now see diesel cars as a cause of their roadside NO<sub>2</sub> pollution problem. Concerned about the air pollution arising from diesel cars, Mayors of Paris,

Mexico City, Madrid and Athens<sup>[3]</sup> signed at the C40 Mayors Summit held in Mexico City in December 2016 an Air Quality Declaration, committing to removing all diesel vehicles from their cities by 2025 to tackle air pollution. It is worth noting that the C40 Mayors Summit aims to bring together world-leading mayors to advance urban solutions to Climate Change.

To reduce our GHG emissions, the Government has been taking a multi-pronged approach. A key component of the approach is to reduce the GHG emissions from the power generation sector, which accounts for about 70% of our carbon emissions, by increasing the use of natural gas in the fuel mix. The fuel mix target for 2020 is to increase the proportion of natural gas for power generation from around 27% in 2015 to around 50% in 2020. For the transportation sector, which accounts for about 17% of the carbon emissions, the Government would continue to adopt better urban planning, ensure the public transport would remain as the preferred choice for daily commute, expand the railway system, and promote low and zero carbon choices such as walking and cycling to reduce the sector's carbon footprint.

**(e) advise whether the Administration would consider adopting a different set of emission standards for diesel private cars, or imposing a statutory ban on new registration of these vehicles in Hong Kong, if it is found that the emission performance of California LEV III-compliant diesel private cars in real-world driving is not superior to that of their Euro VI counterparts.**

As explained in our responses to (b) and (c) above, the California LEV III emission standards for diesel private cars are more stringent than Euro VI standards and are appropriate for Hong Kong which faces severe roadside NO<sub>2</sub> challenges. While the possibility of imposing a ban on diesel private cars cannot be ruled out, we consider that the adoption of California LEV III standards should be an effective and balanced approach at the moment to allow only diesel private cars that meet the more stringent California LEV III emission standards to be imported into Hong Kong rather than pursuing a complete ban. We will continue to monitor international developments on vehicle emission standards, and will adopt emission controls most appropriate to the Hong Kong circumstances.

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<sup>3</sup> Anne Hidalgo, Miguel Ángel Mancera, Manuela Carmena and Giorgos Kaminis. "C40 MAYORS AIR QUALITY COMMITMENT", 1 December 2016



## **Ex-gratia payment scheme to phase out pre-Euro IV diesel commercial vehicles**

*2. Given that the ex-gratia payments under the scheme to phase out pre-Euro IV diesel commercial vehicles ("DCVs") including goods vehicles, light buses and non-franchised buses are calculated with reference to the average taxable values of new vehicles to eligible vehicle owners, the Administration is requested to advise whether it will consider increasing the ex-gratia payments to address the concern about the price premium between Euro V models and Euro VI models, and hence the additional costs for replacing pre-Euro IV DCVs by Euro VI models after tightening of the statutory emission standards of newly registered vehicles (including DCVs) to Euro VI, with a view to encouraging owners of pre-Euro IV DCVs to switch to Euro VI models early.*

When seeking funding approval from the Finance Committee of the LegCo for the "Ex-gratia payment for phasing out pre-Euro IV diesel commercial vehicles" on 10 January 2014 (FCR(2013-14)52), we explained that the ex-gratia payment level is inversely correlated with the age of the vehicle to be phased out and will remain the same throughout the scheme period. Ex-gratia payment is payable irrespective of whether new vehicles are bought as replacement. Vehicle owners who choose to scrap their vehicles ahead of the mandatory retirement deadlines may receive a higher ex-gratia payment, having regard to the age of their vehicles. This will give extra impetus for vehicle owners to take actions earlier. Raising the ex-gratia payment levels will be grossly unfair to those who have already phased out their DCVs under the scheme.

## **Applicability of statutory emission standards on cross-boundary vehicles**

*3. The Administration is requested to explain whether non-commercial cross-boundary vehicles from the Mainland which have been issued or will be issued with International Circulation Permits for use in Hong Kong are subject to Hong Kong's prevailing statutory emission standards for newly registered vehicles of the same class.*

For non-commercial vehicles of Mainland (including Mainland official vehicles and Mainland enterprise vehicles) with approved quotas for travelling to Hong Kong, quota holders are required to apply for International Circulation Permits (ICPs) from the Transport Department (TD) in

accordance with the Road Traffic (Registration and Licensing of Vehicles) Regulations (Cap. 374E) before these vehicles can enter Hong Kong. These vehicles are required to pass the mechanical inspection in Hong Kong before applying for an ICP. The TD will inspect the vehicles in accordance with the vehicle construction requirements stipulated in the relevant international convention of the ICP. The main purpose is to ensure such vehicles are in good working order and in safe mechanical condition. The exhaust emission system is required to operate in good condition, but there is no specific requirement on exhaust emissions level.

Emission Limits for Euro 5, Euro 6, California LEV II and California LEV III Private Cars

Euro 5 & Euro 6

Fuel	Durability (km)		Emission Limits													
			Nitrogen Oxides (mg/km)		Volatile Organic Compounds (Hydrocarbons) (mg/km)		Volatile Organic Compounds (Hydrocarbons) and Nitrogen Oxides (mg/km)		Non-methane Hydrocarbons (mg/km)		Carbon Monoxide (mg/km)		Respirable Suspended Particulates (mg/km)		Particle Number (#/km)	
			Euro 5	Euro 6	Euro 5	Euro 6	Euro 5	Euro 6	Euro 5	Euro 6	Euro 5	Euro 6	Euro 5	Euro 6	Euro 5	Euro 6
Petrol	160,000		60	60	100	100	N/A		68	68	1000	1000	4.5	4.5	N/A	6x10 <sup>11#</sup>
Diesel			180	80	N/A		230	170	N/A	N/A	500	500	4.5	4.5	6x10 <sup>11</sup>	6x10 <sup>11</sup>

**Remark:** # For direct injection engine only. Preliminary PN limit 6x10<sup>12</sup> (#/km) for Euro 6b; and final PN limit 6x10<sup>11</sup> (#/km) for Euro 6c

California LEV II & California LEV III

Fuel	Durability (km)		Emission Limits											
			Nitrogen Oxides (mg/km)		Non-Methane Organic Gas (mg/km)		Non-Methane Organic Gas and Nitrogen Oxides (mg/km)		Formaldehyde (mg/km)		Carbon Monoxide (mg/km)		Respirable Suspended Particulates (mg/km)	
			LEV II	LEV III	LEV II	LEV III	LEV II	LEV III	LEV II	LEV III	LEV II	LEV III	LEV II	LEV III
Petrol/ Diesel	193,200	241,500	43	N/A	56	N/A	N/A	99	11	2.5	2610	2610	6.2	6.2