



33/F, Revenue Tower, 5 Gloucester Road, Wan Chai, Hong Kong  
香港灣仔告士打道5號稅務大樓33樓

**ACE Paper 15/2016**

***For discussion on 14 November 2016***

**Proposals to Tighten Emission Standards for  
Newly Registered Vehicles**

**PURPOSE**

This paper consults Members on our proposal to start from 1 July 2017 tightening the statutory emission standards for newly registered motor vehicles (except diesel private cars) to Euro VI in phases, and for newly registered diesel private cars to California LEV III, for better roadside air quality.

**BACKGROUND**

2. To improve roadside air quality and protect public health, our standing policy is to tighten motor vehicle fuel and emission standards in line with international developments when there is an adequate supply of compliant fuels and vehicles in Hong Kong. With the support of this Council and approval of the Legislative Council, we have been tightening the emission standards for newly registered vehicles as follows, having regard to the prevailing standards at that time :

<b>Vehicle Class</b>	<b>Emission Standard</b>	<b>Implementation Date for Newly Registered Vehicles</b>
Private car (diesel)	California LEV II	1 January 2006
Motor cycle and tricycle	Euro III	1 January 2007
Private car (petrol) and taxi	Euro V	1 June 2012

Goods vehicle (except diesel light goods vehicle with design weight not more than 3.5 tonnes), light bus and bus	Euro V	1 June 2012
Diesel light goods vehicle with design weight not more than 3.5 tonnes	Euro V	31 December 2012

### Vehicles except Diesel Private Cars and Motor Cycles and Tricycles

3. The European Union (EU) started tightening emission standards for newly registered vehicles (except motor cycles and tricycles) in phases to Euro VI on 31 December 2013, according to the following timetable :

Category of Vehicles	Commencement Date	
	Euro VI OBD Phase A/B	Euro VI OBD Phase C
Heavy Duty Vehicle <sup>[1]</sup>	31 December 2013	31 December 2016
	<b>Euro 6b</b> <sup>[2][3]</sup> <b>OBD Euro 6-1</b>	<b>Euro 6c</b> <sup>[4]</sup> <b>OBD Euro 6-2</b>
Light Duty Vehicle (passenger car)	1 September 2015	1 September 2018
Light Duty Vehicle (goods vehicle)	1 September 2016	1 September 2019

4. The initial phase of the tightening was the introduction of more stringent emission standards in the certification emission test as well as other requirements such as new testing procedures for heavy duty vehicles, more comprehensive checking on emissions by the On Board Diagnostic (OBD)<sup>[5]</sup> system, etc. The subsequent phases mainly involve tightening in stages of the requirements for the OBD system.

5. In Asia, Korea was the first economy to implement Euro VI emission standards which took effect from January 2015. The next one will be Singapore

<sup>1</sup> EU defines heavy duty vehicles as vehicles of design weight more than 3.5 tonnes, irrespective of their fuel types. Smaller vehicles are called light duty vehicles.

<sup>2</sup> By now, Euro 6a has been superseded by Euro 6b. Vehicles in compliance with Euro 6a can no longer register in EU.

<sup>3</sup> Euro 6b adopts a revised measurement procedure for particulate matters and a preliminary particle number standard for petrol vehicles with direct injection engines.

<sup>4</sup> Euro 6c adopts a final particle number standard for petrol vehicles with direct injection engines.

<sup>5</sup> Definition of OBD as defined in EU Commission Regulation 582/2011 is "A system on board a vehicle or connected to an engine which has the capability of detecting malfunctions, and, if applicable, of indicating their occurrence by means of an alert system, of identifying the likely area of malfunction by means of information stored in computer memory, and of communicating that information off-board".

which plans to do so in September 2017.

6. A table showing the Euro V and Euro VI emission standards is at **Annex A**. Compared with their Euro V counterparts, Euro VI heavy duty diesel vehicles emit about 80% less nitrogen oxides (NO<sub>x</sub>) and 50% less respirable suspended particulates (RSP) while Euro VI light duty diesel vehicles emit about 55% less NO<sub>x</sub>. Petrol light duty vehicles are subject to the same emission limits for both Euro V and Euro VI emission standards except for those petrol vehicles equipped with direct injection engines. In recent years, direct injection petrol engines are gaining popularity in Europe because of better fuel economy and some Japanese vehicle manufacturers have also started developing such engines. However, since they also emit PM<sub>2.5</sub> like diesel engines, EU introduced in the Euro VI standard a Particle Number (PN) limit for them as in the case of their diesel counterparts.

### **Diesel Private Cars**

7. In the case of diesel private cars, which generally emit more NO<sub>x</sub> and RSP than petrol cars, the standing policy is to adopt the most stringent emission standards to discourage registration of these vehicles. To this end, we have adopted the emission standard of California for diesel private car since 1998. In 2015, California has tightened its vehicle emission standards to LEV III. A comparison of the California LEV II and LEV III standards is at **Annex B**. California's emission standard remains an effective means to discourage the first registration of diesel private cars.

8. Since 2010, more diesel cars have joined the private car fleets. The number of registered diesel private cars increased significantly from 2 066 in December 2009 to 6 505 in August 2016. These diesel private cars were allowed first registration even they did not meet the California standards, because they could comply with the prevailing statutory EU emission standards for petrol private car. In recent years, however, evidence<sup>[6]</sup> has emerged that diesel private cars emit more NO<sub>x</sub> on road than in an emission certification laboratory. Furthermore, the emission monitoring technology for diesel vehicles is still rudimentary, which makes effective identification of poorly maintained diesel vehicles with excessive NO<sub>x</sub> emissions difficult. Unless we undertake new measure to tighten control of emission standards of diesel private cars, the latter is mostly likely to continue to

---

<sup>6</sup> i) Vicente Franco, Francisco Posada Sanchez, John German, and Peter Mock (2014). Real-World Exhaust Emissions from Modern Diesel Cars. The International Council on Clean Transportation  
ii) The Department for Transport of United Kingdom (2016). Vehicle Emissions Testing Programme. The Department for Transport of United Kingdom  
iii) Transport & Environment (2016). Dieselgate: Who? What? How? Transport & Environment

grow quickly in the coming years, posing significant risk to roadside air quality.

### **Motor Cycles and Tricycles**

9. For motor cycles and tricycles, EU will implement Euro IV emission standards in January 2017. Compared with their Euro III counterparts, Euro IV motor cycles emit about 60% less NO<sub>x</sub> and 50% less volatile organic compounds (VOC) from the tailpipes. EU will also introduce control on evaporative emission of VOC and requirements for OBD system to further reduce their emissions. A table showing the standards of Euro III and Euro IV for motor cycles and tricycles is at **Annex C**. Taiwan plans to follow EU's timetable to implement Euro IV standards for motor cycles and tricycles.

## **CONSULTATION WITH THE TRADES**

### **Euro VI Vehicles Suppliers**

10. According to vehicle suppliers<sup>[7]</sup>, all major vehicle suppliers would be able to put on the local market Euro VI private cars and taxis, starting from September 2016; and Euro VI commercial vehicles starting from January 2017, except bus with design weight not more than 7 tonnes and light bus with design weight more than 3.5 tonnes, for which their major suppliers are still working on Euro VI models. We have consulted the relevant trades (including the transport trades and vehicle maintenance trade) since late last year, proposing to adopt Euro VI standards for newly registered vehicles in steps – private car & taxi from 1 September 2016; bus (double-decker) from 1 January 2018; and remaining classes (except bus of design weight not more than 7 tonnes and light bus of design weight more than 3.5 tonnes) from January 2017.

### **The Transport Trades**

11. We have consulted the relevant transport trades including operators of taxi, truck, non-franchised bus and franchised bus in December 2015 about the initial proposal. The transport trades asked for deferring the proposed implementation

---

<sup>7</sup> The consultation involved the Hong Kong Motor Traders Association (MTA), whose members are local representatives of major motor vehicle manufacturers; the Automotive Council of European Chamber of Commerce in Hong Kong (EuroCham), whose members are European vehicle manufacturers; the Right Hand Drive Motor Association (Hong Kong) Limited (RHDA), which represents parallel importers; the Hong Kong Bus Suppliers Association (HKBSA), whose members are bus manufacturers; and the Hong Kong Trucks Merchants Association Limited (HKTMA), which represents truck merchants.

timetable for diesel commercial vehicles by at least one year to allow more Euro VI vehicle models on the local market and more time for vehicle mechanics to pick up the maintenance skill for these commercial vehicles of advanced engine design.

### **The Vehicle Maintenance Trade**

12. We have consulted the Hong Kong Commercial Vehicle Maintenance Association, Environmental Vehicle Repairers Association and the Hong Kong Vehicle Repair Merchants Association, all of which represent the local vehicle maintenance trade, particularly those not associated with the authorized local agents of vehicle manufacturers. They do not object to the proposal and are proactive in helping us organize vehicle maintenance seminars in conjunction with Vocational Training Council and vehicle manufacturers to disseminate maintenance information for diesel commercial vehicles of advanced engine design. We will continue holding these seminars to help the vehicle maintenance trade master the skill to repair diesel vehicles of advanced engine design.

### **Diesel Private Car Suppliers**

13. Some diesel private car vendors argued that the Government should adopt the Euro VI emission standards for petrol private cars rather than the LEV III despite the fact that diesel private cars are currently subject to control of LEV II. They opined that the adoption of LEV III would discourage first registration of diesel private cars and reduce choices for car buyers. Their key arguments are that (a) the emissions of diesel private cars should be evaluated holistically because they have the edge over petrol ones for emissions except higher NO<sub>x</sub> and (b) the relatively small population of diesel private cars is unlikely to create as much adverse impact to roadside air quality as diesel commercial vehicles.

14. We do not agree to the arguments of diesel private car vendors. Our roadside air quality has been and is still suffering from high NO<sub>x</sub> levels. As explained in paragraph 8 above, the higher level of emissions of diesel private cars during real driving coupled with the lack of an effective means to catch poorly maintained diesel private cars with excessive emissions for repair will continue to pose significant risk to our roadside air quality, particularly in terms of NO<sub>x</sub> emissions. Furthermore, since diesel, the dominant fuel for commercial vehicles, is not subject to fuel duty, the failure to adopt LEV III standards will continue to tip the balance in the favour of diesel private car owing to potential fuel cost saving. Unless actions are taken, more diesel private cars will continue to grow at a pace much faster than petrol private cars in the local market as the past few years,

thereby creating more serious roadside air pollution. We consider that the California standards remain to be an effective means and the more stringent LEV III should be adopted.

### **Motor Cycle and Tricycle Suppliers**

15. According to the motor cycle and tricycle suppliers<sup>[8]</sup>, the supply of Euro IV motor cycles is still limited in the local market, and the availability timing is still yet to be known.

### **THE PROPOSAL**

16. Having regard to feedback received during the consultation, we recommend the following implementation timetable for the **Euro VI** emission standards :

#### **Light Duty Vehicles with Design Weight not more than 3.5 Tonnes**

<b>Vehicle Class</b>	<b>Proposed Commencement Date</b>	
	<i><b>Euro 6b OBD Euro 6-1</b></i>	<i><b>Euro 6c OBD Euro 6-2</b></i>
Private Car (petrol) and Taxi	1 July 2017	1 September 2019
Light bus and Goods Vehicle	1 January 2018	1 September 2020

#### **Heavy Duty Vehicles with Design Weight more than 3.5 Tonnes**

<b>Vehicle Class</b>	<b>Proposed Commencement Date</b>	
	<i><b>Euro VI OBD Phase A/B</b></i>	<i><b>Euro VI OBD Phase C</b></i>
Bus (design weight more than 9 tonnes) and Goods Vehicle	1 January 2018	1 April 2019
Bus (design weight not more than 9 tonnes <sup>[#]</sup> ) and Light Bus	Awaiting an adequate supply of Euro VI models on the local market	

Notes: # Revised from “not more than 7 tonnes” to “not more than 9 tonnes” at the advice of the Hong Kong Bus Suppliers Association

<sup>8</sup> The consultation involved Hong Kong Motorcycle Association and Hong Kong Motorcycle Chamber of Commerce which comprise representatives of major motor cycle manufacturers and parallel importers.

17. As for bus (design weight not more than 9 tonnes) and light bus (design weight more than 3.5 tonnes), we will continue to monitor closely their supplies with a view to tightening their emission standards to Euro VI as soon as practicable.

18. In tightening the emission standards, we will maintain the current practice of accepting Japan and US standards which are not inferior to the Euro VI requirements.

19. For newly registered **diesel private cars**, we will tighten the emission standards to California LEV III, starting from 1 July 2017, and will not accept diesel private cars meeting Euro VI petrol car standards.

20. We will continue to work with **motor cycle and tricycle** suppliers on a practicable timetable to tighten as soon as possible the relevant emission standards to Euro IV for consulting this Council.

## **PUBLIC REACTIONS**

21. The public is expected to support the proposal, which will help further reduce the emissions of motor vehicles and improve roadside air quality.

## **ADVICE SOUGHT**

22. Members' views are sought on the proposals set out in paragraphs 16 to 20 above.

**Environmental Protection Department**  
**November 2016**

**Euro V and Euro VI Emission Standards for Motor Vehicles**

Design Weight	Vehicle Class	Durability (km)	Emission Limits														
			Nitrogen Oxides		Volatile Organic Compounds (Hydrocarbons)		Respirable Suspended Particulates		Particle Number								
			Euro V	Euro VI	Euro V	Euro VI	Euro V	Euro VI	Euro V	Euro VI							
Not more than 3.5 tonnes	Private Car (Petrol)	160,000	60	60	100	100	4.5	4.5	Not	6x10 <sup>11</sup> ^#							
	Taxi (Petrol/LPG)		(mg/km)	(mg/km)	(mg/km)	(mg/km)	(mg/km)	(mg/km)	Applicable	(#/km)							
	Goods Vehicle (Petrol)		82	82	160	160	4.5	4.5	Not	6x10 <sup>11</sup> ^#							
	Light Bus (Diesel)		280	125	Not Applicable		4.5	4.5	6x10 <sup>11</sup>	6x10 <sup>11</sup>							
	Goods Vehicle (Diesel)										(mg/km)	(mg/km)	(mg/km)	(mg/km)	(#/km)	(#/km)	
More than 3.5 tonnes	Goods Vehicle (weight not more than 16 tonnes)	300,000	2,000	400	460	130	20	10	Not	8x10 <sup>11</sup>							
	Goods Vehicle (weight more than 16 tonnes)	700,000									(mg/kWh)	(mg/kWh)	(mg/kWh)	(mg/kWh)	(mg/kWh)	Applicable	(#/kWh)
	Bus (weight more than 9 tonnes)	700,000															

**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 and LEV III Standards for Private Cars**

<b>California Standards</b>	<b>Durability (km)</b>	<b>Emission Limits</b>		
		<b>Non Methane Organic Gas (mg/km)</b>	<b>Nitrogen Oxides (mg/km)</b>	<b>Respirable Suspended Particulates (mg/km)</b>
LEV II	193,200	56	43	6.21
LEV III	241,500	99		6.21

**Euro III and Euro IV Emission Standards for Motor Cycles & Tricycles**

Vehicle Class	Emission Limits			
	Nitrogen Oxides (mg/km)		Volatile Organic Compounds (mg/km) (Hydrocarbons)	
	Euro III	Euro IV	Euro III	Euro IV
Motor Cycle & Motor Tricycle (Petrol)	220	90	330	170