

For discussion on  
27 November 2015

LEGISLATIVE COUNCIL  
PANEL ON ENVIRONMENTAL AFFAIRS

Proposals to Tighten Emission Standards of  
Newly Registered Vehicles

**PURPOSE**

This paper consults Members on our proposals to

- (a) tighten the statutory emission standards for newly registered motor vehicles to Euro VI in phases, starting from 1 September 2016; and
- (b) consult motor cycle and tricycle suppliers for working out a proposal to tighten the emission standards of newly registered motor cycles and tricycles to Euro IV.

**BACKGROUND**

2. Motor vehicles (including motor cycles and tricycles) are the major sources of roadside air pollution, accounting for about 23%, 18% and 23% of the local emission of nitrogen oxides (NO<sub>x</sub>), respirable suspended particulates (RSP) and volatile organic compounds (VOC) respectively in 2013 <sup>[1]</sup>. The emissions have caused from time to time high levels of nitrogen dioxide (NO<sub>2</sub>) and RSP, particularly when the ozone level in the Pearl River Delta (PRD) region is high, thereby increasing the health risk to the public.

3. While motor cycles and tricycles account for about 6% of the whole vehicle fleet, they together emitted about 42% of the vehicular VOC emissions. Reducing their VOC emissions could help alleviate the ozone problem in the PRD region. The respective vehicular emission contributions to and the numbers of different vehicle classes are at **Annex 1**.

4. To improve roadside air quality and protect public health, it has been our standing policy to tighten motor vehicle fuel and emission standards with reference to

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<sup>1</sup> According to the latest air pollutant emissions inventory compiled by the Environmental Protection Department.

the latest international developments and when compliant fuels and vehicles become practicable options in Hong Kong. With the approval of the Legislative Council, we tightened the emission standards of newly registered vehicles (except motor cycles and tricycles) to Euro V in June 2012 and for newly registered motor cycles and tricycles to Euro III in January 2007. Both standards were the prevailing emissions standards in the European Union (EU) at the time. We also tightened the specifications of motor vehicle diesel and petrol to Euro V in July 2010.

5. EU started tightening in phases its vehicle emission standards for newly registered vehicles to Euro VI on 31 December 2013, firstly with vehicles of design weight over 3.5 tonnes. Its detailed plan is in the following table.

<b>Category of Vehicle</b>	<b>Implementation Date</b>
Heavy Duty Vehicles (design weight over 3.5 tonnes)	31 December 2013
Light Duty Vehicles (passenger cars)	1 September 2015
Light Duty Vehicles (goods vehicles)	1 September 2016

6. Compared with their Euro V counterparts, Euro VI heavy duty <sup>[2]</sup> diesel vehicles emit about 80% less NO<sub>x</sub> and 50% less RSP while Euro VI light duty diesel vehicles emit about 55% less NO<sub>x</sub>. All petrol vehicles on the local market are light duty vehicles and will remain so. They 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. Direct injection petrol engines are gaining popularity in Europe in recent years because of better fuel economy and some Japanese vehicles manufacturers have also started developing such engines. However, these petrol engines could emit a substantive amount of fine particles (i.e. PM<sub>2.5</sub>), as diesel engines. EU will thus introduce in Euro VI standard a Particle Number (PN) limit for this type of petrol vehicle as in the case of their diesel counterparts. A comparison of the emission limits between Euro V and VI vehicles are in **Annex 2**. In Asia, Korea started implementing Euro VI emission standards in January 2015 while Singapore will do so in September 2017.

7. 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 VOC from the tailpipes. Control on evaporative emission of VOC and requirements for On Board Diagnostic (OBD) system will also be introduced to further reduce their emissions. Taiwan will

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<sup>2</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.

follow EU's time table to implement Euro IV standards for motor cycles and tricycles.

## **CONSULTATION WITH VEHICLE SUPPLIERS**

8. To tighten the vehicle emission standards for newly registered vehicles, we have to ensure that a reasonable supply of the relevant vehicle models can be made available to Hong Kong. We have hence consulted vehicle suppliers including the Hong Kong Motor Traders Association (MTA), which comprises local representatives of major motor vehicle manufacturers; the Automotive Council of European Chamber of Commerce in Hong Kong (EuroCham), which comprises representatives of European vehicle manufacturers; the Right Hand Drive Motor Association (Hong Kong) Limited (RHDA), which comprises representatives of parallel importers; the Hong Kong Bus Suppliers Association (HKBSA), which comprises local representatives of bus manufacturers; and the Hong Kong Trucks Merchants Association Limited (HKTMA), which comprises representatives of truck merchants, about tightening the emission standards for newly registered vehicles (except motor cycles and tricycles) to Euro VI. Their feedback has indicated that Euro VI vehicles are either already or will soon become practicable alternatives, depending on vehicle classes. Details are in the ensuing paragraphs.

### **Vehicle Supply**

#### ***Petrol Vehicles (including Private Cars and Vans and Petrol & LPG Taxis)***

9. This is the least affected vehicle category if we are to tighten the standard because the emission control technology of petrol and liquefied petroleum gas (LPG) vehicles has been so mature that EU has adopted the Euro V emission limits for their Euro VI emission standards except the introduction of a PN limit for those equipped with direct injection engines.

10. Our petrol vehicles are predominantly private cars. From July 2014 to June 2015, European petrol cars have accounted for about 45% of newly registered petrol private cars. As EU has started requiring petrol light duty vehicles to comply with Euro VI emission standards from 1 September 2015 onwards, European petrol vehicle manufacturers are introducing their Euro VI petrol vehicles on the local market. In the case of Japanese petrol vehicle manufacturers, about 70% of their type-approved petrol vehicle models are already in compliance with Euro VI emission standards. They are also working to upgrade the remaining models to Euro VI. As such, the supply of Euro VI petrol private cars on the local market is not a problem even by

now.

11. As for taxis and petrol vans, all the models on sale here are already Euro VI models.

### ***Diesel vehicles***

12. As for diesel heavy duty vehicles, EU introduced Euro VI emission standards on 31 December 2013. Since then, the number of Euro VI diesel commercial heavy duty vehicles on the local market has been increasing. To encourage their early introduction and use, we tightened the qualifying standards for tax concession for the Environment-friendly Commercial Vehicles Scheme to Euro VI from April 2015. As at 11 November 2015, the number of Euro VI diesel heavy duty vehicle models grew to about 170 from 130 before the tightening. We have also noted that vehicle manufacturers other than European ones are also making efforts to supply Euro VI diesel heavy duty vehicles to the local market.

13. Based on the feedback of vehicle suppliers, the supply of Euro VI diesel heavy duty vehicles will largely be adequate by 1 January 2017 except Euro VI double-decked buses and buses with design weight not more than 7 tonnes and light buses with design weight more than 3.5 tonnes. The supply of Euro VI double-decked buses will largely become adequate by 1 January 2018. As for the remaining two vehicle classes, major vehicle suppliers are still making efforts to supply Euro VI vehicles. We will closely monitor the development for working out a practicable timetable to introduce Euro VI emission standards.

### **Vehicle Prices**

14. Vehicle suppliers have advised us that vehicle prices are market driven and determined by many factors other than emission standards such as economic climate, currency rates, sales strategies, competition in the market, etc. As the production volume increases, the cost of producing Euro VI vehicles is expected to decrease. The government endeavors to facilitate the supply of additional Euro VI vehicle models and hence maintains sufficient competition in the local market.

### **Fuel Economy**

15. Vehicle manufacturers are under pressure to make their vehicles more fuel efficient on top of improving their emission performance to meet with the latest statutory requirements, partly to make their vehicles more competitive and partly to

reduce their carbon footprint. Some vehicle manufacturers have provided us with feedback of users of their Euro VI vehicles that these vehicles consumed about 10% less fuel as compared to Euro V diesel counterparts.

## **Maintenance**

16. To meet Euro VI emission standards, Euro VI vehicles will basically rely on emission control technologies which are already deployed in Euro V vehicles. The major difference is that the emission control technologies are applied more comprehensively and with greater effectiveness. As such, vehicle manufacturers do not see Euro VI vehicles presenting new maintenance challenges. They appreciate the merits of disseminating maintenance information to the local vehicle maintenance trade.

17. In recent years, vehicle suppliers have taken further steps to publicize vehicle maintenance information in conjunction with Vocational Training Council (VTC) and EPD. We have been organizing seminars on vehicle maintenance techniques for vehicle mechanics. We will continue to cooperate with VTC and the vehicle suppliers in organizing such training.

18. In addition, vehicle manufacturers will make arrangement for the public to get vehicle maintenance information from them though a cost may apply. This will indeed be part of the Euro VI emission standard requirements.

19. Regarding maintenance cost, we also noted that some vehicle suppliers have offered maintenance package for their Euro VI vehicles that is more competitive than that for their Euro V vehicles.

## **DIESEL PRIVATE CAR EMISSIONS**

20. Diesel cars generally emit more NO<sub>x</sub> and particulates, which are key roadside air pollutants, than petrol cars. Since 1998, EPD has only allowed diesel private cars meeting the emission standards of petrol private cars to register in Hong Kong. In recent years, some diesel private cars have been able to meet this stringent emission requirement and have been allowed to be registered here. The number of such diesel private cars increased from 2 606 in December 2013 to 5 290 in August 2015. However, despite meeting the emission standards for petrol vehicles, these diesel private cars could emit much more NO<sub>x</sub> than their petrol counterparts while on roads when compared with the laboratory tests.

21. We have concerns about the relatively high on-road emissions of diesel private cars as compared with petrol private cars despite their meeting the emission standards. Given its growing population in Hong Kong in recent years, we consider there is a case to review new registration of diesel private cars to avoid them aggravating our roadside air pollution. After all, the majority of our private car fleet runs on petrol, which could readily meet the tight NOx emission limit when use on roads. Their emissions can also be effectively monitored by our inspection and maintenance programme using remote sensing technology. We will embark on a review on whether more stringent control is appropriate on new registration of diesel private cars having regard to their emissions when in use on road and their impact on our local air quality, local market situations, technological developments, and other relevant considerations. We would engage stakeholders in the review and aim to report the outcome to this Panel early next year.

## **THE PROPOSAL**

22. With the increasing supply of Euro VI vehicles on the local market, we propose to tighten the vehicle emission standards for all newly registered motor vehicles (excluding motor cycles and tricycles) to Euro VI according to the proposed implementation timetable below –

<b>Vehicle Class</b>	<b>Proposed Implementation Date</b>
Private Car & Taxi	1 September 2016
Buses (double-decked buses)	1 January 2018
Remaining Vehicle Classes <sup>(Note)</sup>	1 January 2017

Note: Not including buses (design weight not more than 7 tonnes) and light buses (design weight more than 3.5 tonnes)

23. As for buses (design weight not more than 7 tonnes) and light buses (design weight more than 3.5 tonnes), we will continue to monitor closely their supply with a view to tightening their emission standards to Euro VI as soon as practicable.

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

25. The supply of Euro IV motor cycles and tricycles is now limited on the local

market but it will improve as their manufacturers are gearing up for EU's Euro IV implementation schedule. We have engaged motor cycle and tricycle suppliers with a view to working out a practicable proposed implementation timetable.

## **NEXT STEPS**

26. We will consult the Advisory Council on the Environment and commence the consultation with other stakeholders such as the transport trades, vehicle maintenance trade, etc. about the proposal to tighten the emission standard for newly registered vehicles (except motor cycles and motorcycles). We will report to this Panel on these findings before taking forward the effective legislation. The new vehicle emission standard will be implemented by way of amending the Air pollution Control (Vehicle Design Standards)(Emission) Regulations (Cap 311J).

27. We will undertake a review on the current policy relating to new registration of diesel private cars having regard to their emissions when in use on road and other relevant considerations. We will engage the stakeholders as appropriate in the review. In addition, we will continue our engagement with motor cycle and tricycle suppliers with a view to tightening the emission standards for newly motor cycles and tricycles as soon as practicable.

## **ADVICE SOUGHT**

28. Members' views are sought on the proposals set out in paragraphs 22 to 25 above.

**Environmental Protection Department**  
**November 2015**

**Vehicle Emission Contributions and Vehicle Numbers of Different Classes of Vehicles in 2013**

	RSP	NO <sub>x</sub>	VOC	No. of Vehicles
Motorcycles	0.6%	0.6%	42.0%	42 600
Private Cars	1.7%	2.2%	17.0%	477 000
Taxis	0.0%	16.4%	5.6%	18 200
Public Light Buses	6.3%	2.9%	6.9%	4 350
Private Light Buses	1.1%	0.5%	0.6%	4 050
Light Goods Vehicles	18.8%	14.4%	5.9%	75 800
Medium & Heavy Goods Vehicles	56.1%	34.0%	17.9%	43 300
Non-franchised Buses	10.6%	7.0%	2.1%	7 940
Franchised Buses	4.5%	22.1%	2.0%	5 788
Total				679 000



**Proposed Implementation Timetable and Emissions Reductions**

Design Weight	Vehicle Class	Proposed Effective Date	Proposed Emission Standards	Emission Limits							
				NOx		VOC (HC)		RSP		Particle No.	
				Euro V	Euro VI	Euro V	Euro VI	Euro V	Euro VI	Euro V	Euro VI
Not more than 3.5 Tonnes	Private Car	1 September 2016	Euro VI	60	60	100	100	4.5	4.5	Not Applicable	6x10 <sup>11</sup> <sup>^</sup>
	Taxi			(mg/km)	(mg/km)	(mg/km)	(mg/km)	(mg/km)	(mg/km)	(#/km)	
	Light Bus	1 January 2017		280	125	Not Applicable		4.5	4.5	6x10 <sup>11</sup>	6x10 <sup>11</sup>
	Goods Vehicle			(mg/km)	(mg/km)	(mg/km)	(mg/km)	(#/km)	(#/km)		
More than 3.5 Tonnes*	Goods Vehicle	1 January 2017	Euro VI	2,000	400	460	130	20	10	Not Applicable	8x10 <sup>11</sup>
	Bus (with design weight more than 7 tonnes excluding double-decked bus)										
	Double-decked Bus	1 January 2018									
				<b>Euro III</b>	<b>Euro IV</b>	<b>Euro III</b>	<b>Euro IV</b>	<b>Euro III</b>	<b>Euro IV</b>	<b>Euro III</b>	<b>Euro IV</b>
Not Applicable	Motor Cycle & Motor Tricycle	As soon as practicable	Euro IV	220	90	330	170	Not Applicable		Not Applicable	
				(mg/km)	(mg/km)	(mg/km)	(mg/km)				

**Remark:** \* For buses with design weight not more than 7 tonnes and light buses with design weight more than 3.5 tonnes, we are monitoring closely their supply with a view to tightening their emission standards to Euro VI level as soon as practicable.

<sup>^</sup> For direct injection engine only.