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Proposals to Tighten Emission Standards for Newly Supplied Non-Road Vehicles under the Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation

PURPOSE

This paper consults Members on our proposal to tighten the statutory emission standards for newly approved non-road vehicles supplied for local use under the Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation (Cap 311Z) (the Regulation), in line with the tightening of the emission standards for road vehicles.

BACKGROUND

2. To improve air quality and protect public health, the Regulation was enacted on 1 June 2015 to control emissions from non-road mobile machinery (NRMM) (including non-road vehicles[1] and regulated machines[2]) for use at specified locations in Hong Kong. These specified locations include, for instance, airport restricted

[1] Non-road vehicle means a private car, goods vehicle, bus, light bus, motor cycle, motor tricycle or special purpose vehicle that—
(a) is powered by an internal combustion engine;
(b) is not licensed under the Road Traffic (Registration and Licensing of Vehicles) Regulations (Cap 374 sub. leg. E); and
(c) is intended to be used exclusively in—
(i) the Restricted Area as defined by section 2(1) of the Airport Authority Ordinance (Cap 483); or
(ii) a private road that is within—
(A) an area wholly or mainly used for the carrying on of construction work within the meaning of section 120 of the Road Traffic Ordinance (Cap 374); or
(B) an area wholly or mainly used for the carrying on of industry within the meaning of section 120 of the Road Traffic Ordinance (Cap 374).

[2] Regulated machine means any mobile machine or transportable industrial equipment (other than a vehicle of a class specified in Schedule 1 to the Road Traffic Ordinance (Cap. 374)) that is powered by an internal combustion engine with a rated engine power output that is greater than 19kW but not greater than 560kW.

areas, container terminals and backup facilities, construction sites, designated waste disposal facilities, etc. All NRMMs for local use have to be approved by the Environment Protection Department (EPD) and in compliance with the emission standards prescribed in the Regulation[3]. As at end of January 2018, there were over 45 600 NRMM (including some 11 870 non-road vehicles and around 33 800 regulated machines).

Non-road vehicles

3. Out of the 11 870 non-road vehicles, there were about 9 200 special purpose vehicles[4]; and 2 671 other vehicles ("other non-road vehicles") including buses, goods vehicles, light buses and private cars. Over 80% of the 2 671 other non-road vehicles are goods vehicles which are mainly used in the airport and container terminals while the remaining non-road vehicles are mostly petrol private cars, diesel buses and diesel light buses operating in airport restricted areas. Detailed breakdown of the 2 671 other non-road vehicles are set out in Table 1.

Table 1: Breakdown of other non-road vehicles as of 31 January 2018

Location	Goods Vehicle	Private Car	Bus	Light Bus	Grand Total
Airport	755**	291	69	33	1 148
Container Terminals	1 051**	14	6	9	1 080
Construction Sites	42	45	-	6	93
Others*	294	46	6	4	350
Sub Total	2 142 (80%)	396 (15%)	81 (3%)	52 (2%)	2 671 (100%)

* Locations such as power plants or waste disposal facilities.

** Over 70% (around 1 300) of the 1 806 goods vehicles at the airport and container terminals are heavy duty vehicles (design weight over 3.5 tonnes).

4. EPD processes around 150 applications for approval of new other non-road vehicles annually (see Table 2).

Table 2: No. of other non-road vehicle applications processed by EPD (up to 31 January 2018)

Year	Goods Vehicle	Private car	Bus	Light bus	Total
2015 (June to December)	104	80	-	13	**197**

[3] Under S(11) of the Regulation, regulated machines or non-road vehicles in Hong Kong on or before 30 November 2015 would be exempted from complying with the emission standard.

[4] Special purpose vehicle means a motor vehicle designed, constructed or adapted primarily for a use other than the carriage of goods, the driver or passengers. Most of the special purpose non-road vehicles are fork lifts operating in goods and cargo storage areas. Other examples of special purpose non-road vehicles include pump trucks & crane trucks, etc. Both special purpose non-road vehicles and their road vehicles counterparts are only required to comply with emission standard on smoke.

Year	Goods Vehicle	Private car	Bus	Light bus	Total
2016	89	34	-	11	**134**
2017	153	23	-	5	**181**
2018 (January)	10	3	-	1	**14**
Sub-total	**356**	**140**	**-**	**30**	**526**

5. It is the Government's standing policy that the prescribed emission standards for all non-road vehicles under the Regulation should be the same as those for road vehicles, so as to prevent the transfer of old road vehicles, which are no longer road worthy, into non-road applications. Hence, the prevailing emission standards of all non-road vehicles under the Regulation were the same as those stipulated under the Air Pollution Control (Vehicle Design Standards) (Emission) Regulation (Cap. 311J) when the Regulation was enacted in 2015.

EMISSION STANDARDS FOR ROAD VEHICLES TIGHTENED

6. The amendments to the Air Pollution Control (Vehicle Design Standards) (Emission) Regulation (Cap. 311J) for the progressive tightening of emission standards of newly registered road vehicles were approved by the Legislative Council on 24 February 2017. The implementation timetable is set out in Table 3 below.

Table 3: Implementation timetable of tightened emission standards for road vehicles[5]

Vehicle Class	Commencement Date	
	Euro 6b On Board Diagnostic (OBD)[6] ***Euro 6-1***[7]	***Euro 6c OBD Euro 6-2***[8]
Private Car (petrol) and Taxi	1 July 2017	1 September 2019
Light bus and Goods Vehicle (both of design weight not more than 3.5 tonnes)	1 January 2018	1 September 2020

[5] There are no changes to the emission standard on smoke which applies to special purpose vehicles. For newly registered buses with a design weight of not more than 9 tonnes and light buses with a design weight of more than 3.5 tonnes, Euro V emission standards continue to apply for the time being as there is yet to have supply of Euro VI models in the local market.

[6] On Board Diagnostic (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".

[7] 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) system, etc.

[8] The subsequent phases mainly involve tightening in stages of the requirements for the OBD system.

	Euro VI OBD Phase A/B[7]	***Euro VI OBD Phase C***[8]
Bus (design weight more than 9 tonnes) and Goods Vehicle (design weight more than 3.5 tonnes)	1 October 2018	1 April 2019
	California LEV III	
Diesel private cars	1 October 2017	

THE PROPOSAL

7. In line with the standing policy in paragraph 5 above, we propose to tighten the emission standards of newly approved other non-road vehicles under the Regulation to bring them in line with the latest statutory vehicle emission standards for newly registered road vehicles. The details are set out in Table 4 below.

Table 4: Proposed tightening of emission standards for other non-road vehicles and the implementation timetable

Vehicle Class[9]	**Prevailing Emission Standard**	**Proposed Emission Standards and Implementation Timetable**	
		Euro 6b OBD Euro 6-1[10]	***Euro 6c OBD Euro 6-2***
Private Car (petrol)	Euro V	1 January 2019	1 September 2019
Light bus and Goods Vehicle (both of design weight not more than 3.5 tonnes)	Euro V	1 January 2019	1 September 2020
		Euro VI OBD Phase A/B[10]	***Euro VI OBD Phase C***
Bus (design weight more than 9 tonnes) and Goods Vehicle (design weight more than 3.5 tonnes)	Euro V	1 January 2019	1 April 2019
Diesel private car	California LEV II	***California LEV III*** 1 January 2019	

9 The current proposal only applies to other non-road vehicle classes where the emission standards of the road vehicles counterparts have been/will be tightened in accordance with Table 3 above. See Footnote 5 for road vehicles where there is no change to the emission standards.

10 While the proposed implementation date for Euro 6b OBD Euro 6-1 and Euro VI OBD Phase A/B in respect of other non-road vehicles are later than those for their road counterparts (ranging from three months to more than one year), it is not envisaged that the gap will create a loophole for used road vehicles which are not road worthy to become non-road vehicles. Vehicle emission test is required for a used road vehicle to demonstrate the compliance with the prescribed emission standards under the Regulation when applying for approval to be used as a non-road vehicle.

CONSULTATION WITH THE TRADES

8. During August and November 2017, we consulted relevant NRMM stakeholders including vehicle suppliers[11], regulated machine suppliers, Hong Kong Construction Association, and operators at the airport and container terminals on our proposal. Vehicle suppliers confirmed that the vehicle supply will phase in the market with the progressive tightening of road vehicle emission standards. During the consultation, the main issue of discussion centered around diesel particulate filter[12] (DPF).

9. To comply with the stringent Euro VI emission standards on Respirable Suspended Particulates (RSP), Euro VI diesel vehicles are equipped with DPF. DPF is a mature emission reduction technology and has been widely adopted by various Japanese vehicle manufacturers starting from their Euro IV models since 2006, such as light buses, coaches and goods vehicles. European vehicle manufacturers, however, have only started adopting DPF in their Euro VI models in recent years.

10. Under normal operations, the temperature of engine exhaust gas passing through the DPF should be high enough to burn off the trapped RSP. However, when operating at slow speed or idling for a prolonged period, the temperature of engine exhaust gas may not be high enough to burn off the trapped RSP. Manual re-generation[13] of DPF is therefore required for this type of operation to remove the trapped RSP which would otherwise clog the DPF, rendering the vehicles inoperable.

11. Of the 2 228 non-road vehicles operating at the airport and container terminals, over 80% (1 806) are goods vehicles, including over 70% (1 300) being heavy duty vehicles (design weight over 3.5 tonnes). Most of these heavy duty vehicles are catering trucks at the airport and heavy duty trucks at the container terminals. A few airport operators have already been using Euro VI catering trucks, supplied by a European vehicle manufacturer, at the airport restricted area. Owing to the speed limit at airport restricted area (i.e. 30 km/hr) and long idling time for catering truck operation, manual regeneration of DPF for around 30 to 45 minutes is required at an interval from once a week to once a month, depending on the daily routine operations of the catering trucks. While indicating no objection to the proposal, a major airport operator advised that it would need to make effort to adapt to the operational requirement of its Euro VI vehicles supplied by this European vehicle manufacturer by scheduling manual DPF regeneration on a regular basis (e.g. weekly). At our request, the European vehicle manufacturer has further refined the manual DPF

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[11] The Hong Kong Motor Traders Association (MTA) was consulted, whose members are local representatives of major motor vehicle manufacturers.

[12] Diesel particulate filter is a device to capture particulate matters generated from fuel combustion inside the engine. Collected RSP will be oxidized and removed from the filter.

[13] Manual re-generation operation of DPF is a manual post-combustion fuel injection process to raise the operating temperature of the DPF in order to burn away the trapped particulates.

regeneration of these catering trucks with a view to lengthening the time interval required for manual DPF regeneration. The remaining airport operators did not raise objection to our proposal, either because their operation was less frequent and hence scheduling of regeneration was not a problem; or because they have been using vehicles from Japanese vehicle suppliers, and have thus got used to manual DPF regeneration[14].

12. For the container terminals, some operators have conducted trial operation of Euro VI container trucks supplied by another European vehicle manufacturer for a few months. The engine of the Euro VI container truck was specially designed to suit local container terminal operations and manual regeneration of DPF was only required once a month. Container terminal operators in general were supportive of the proposal.

WAY FORWARD

13. Subject to Members' views, we will consult the Panel on Environmental Affairs of the Legislative Council in March 2018 on the proposal and aim to complete the legislative exercise in 2018 with a view to tightening the emission standard of other non-road vehicles from 1 January 2019.

ADVICE SOUGHT

14. Members are invited to offer views on the proposal as set out in paragraphs 7 and 13 above.

Environmental Protection Department
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[14] During our consultation, Japanese vehicle suppliers also expressed that they did not foresee operators having problem with manual DPF regeneration for their Euro VI models, because operators have got used to manual DPF regeneration since their Euro IV models.