

Executive Summary

Direct Investigation into Government's Implementation of Strengthened Control of Exhaust Emissions from Petrol and LPG Vehicles

Background

In Hong Kong, the problem of air pollution, especially roadside air pollution, has worsened in recent years. As the emission of excessive nitrogen oxides (“NOx”) from petrol and liquefied petroleum gas (“LPG”) vehicles is one of the main causes for deterioration in air quality, the Government has implemented a new emission control measure (“the New Measure”) from 1 September 2014 to include NOx in the regulatory regime in a bid to improve roadside air quality. Under the New Measure, the Environmental Protection Department (“EPD”) has set up remote sensing equipment to monitor the levels of NOx and other exhaust gases at various locations throughout the territory. Where the equipment detects excessive exhaust emitted from passing vehicles, EPD will issue an Emission Testing Notice (“ETN”) to the vehicle owners concerned, requiring them to send their vehicles within 12 working days for an emission test conducted with a chassis dynamometer (commonly called a “treadmill”) at one of EPD’s Designated Vehicle Emission Testing Centres (“DVETCs”). Failure to pass the test may lead to cancellation of the vehicle licences in question by the Transport Department (“TD”).

2. The New Measure was introduced with good intentions. Nevertheless, the Office of The Ombudsman received public complaints shortly after its implementation, in which the complainants alleged that while their vehicles had just passed TD’s annual examination, they were then notified by EPD to send their vehicles for the treadmill test. Our investigation into those complaint cases revealed that TD has not included NOx emissions, targeted under the New Measure, in its exhaust emission standards adopted in the idle emission test conducted during the annual vehicle examination. Moreover, the 22 Designated Car Testing Centres (“DCTCs”) currently carrying out the annual examination for TD are not equipped with treadmills for testing NOx emissions. In other words, vehicles having passed TD’s annual examination do not necessarily meet the exhaust emission standards of the treadmill test. At present, there are only four DVETCs authorised by EPD to conduct the treadmill test, so it is questionable whether they can cope with the demand for vehicle testing and maintenance generated by the New Measure.

3. Meanwhile, DCTC operators have indicated to EPD and TD that they face various problems (such as manpower, facilities, space, and noise nuisance caused by the tests to the neighbourhood) regarding the installation of treadmills in their centres. As a result, the two departments have yet to draw up a timetable for upgrading the facilities and functions of most, if not all, DCTCs to enable them to conduct the treadmill test. The Ombudsman, therefore, is concerned about whether the inadequate planning and lack of coordination between EPD and TD in the implementation of the New Measure

would cause any inconvenience to the public, and whether the smooth implementation of the New Measure would be compromised because the two departments have failed to fully consider the capacity of existing ancillary facilities (such as the number of repair centres and DCTCs, and their technical levels).

4. In this connection, The Ombudsman declared on 14 April 2015 a direct investigation under The Ombudsman Ordinance (Cap 397).

Our Findings

5. Our investigation has revealed that in the implementation of the New Measure, there are eight inadequacies on the part of EPD and TD in the following four areas.

(A) Inadequate Planning

(1) Failure to Provide Adequate Support for Maintenance Trade before Implementation of the New Measure

6. As early as 2002, the expert group (which included representatives from TD) formed by EPD completed deliberating the consultant's research report, and supported the consultant's proposal of using remote sensing equipment and treadmills for inspection of vehicles with excessive exhaust emissions. However, it was not until November 2011 that EPD convened a working group meeting with members of the expert group (which included those from TD) to study the specific arrangements.

7. In the first month upon the New Measure coming into effect on 1 September 2014, the overall passing rate was just 50% for vehicles undergoing the emission test with treadmills at the DVETCs. In such circumstances, EPD announced on 17 October 2014 two transitional arrangements, i.e. extending the period for passing the emission test from 12 to 25 working days; and providing up to two free emission tests to those petrol and LPG taxis and light buses that have failed in the first test. For the sake of fairness, the same arrangements were applicable to private cars and other petrol vehicles. The transitional arrangements ended on 31 January 2015.

8. Since NO_x are colourless and odourless, it will be difficult to detect any excessive NO_x emissions without specialised equipment (such as treadmills or other portable sensing equipment for NO_x testing). We believe that one of the main reasons for the vehicle maintenance trade to consider itself not yet able to master the repair skills was the lack of suitable equipment for detecting the NO_x emissions of vehicles. Apparently, the Government has overlooked the actual support required by the trade under the New Measure.

(2) Failure to Provide Necessary Training for Vehicle Maintenance Trade at Early Stage

9. EPD only started providing the relevant information to the maintenance trade in April 2013 through demonstrations, technical advice hotlines, seminars and short courses offered jointly with the Vocational Training Council (“VTC”). To date, only some 1,000 mechanics have attended those short courses. Given that there are more than 10,000 mechanics in the trade, the shortfall is obvious. We consider that EPD cannot rely on such a small number of trained mechanics to transfer their technical skills to the entire trade for repairing vehicles with excessive exhaust emissions. Moreover, vehicles manufactured in recent years have relied more and more on computer programs. With the ageing of those vehicles, it can be anticipated that more vehicles with complicated designs will need maintenance and repairs to meet the emission standards. EPD should take a serious look at the technical issues involved in vehicle maintenance, step up its cooperation with VTC and other training organisations, as well as discuss with the Electrical and Mechanical Services Department (“EMSD”) on how to enhance the trade’s ability to provide emission-related repairs through the Voluntary Registration Scheme for Vehicle Mechanics and the Voluntary Registration Scheme for Vehicle Maintenance Workshops.

(3) Failure to Explore the Possibility of Including Emission-related Repairs among Categories of Registered Vehicle Mechanics to Facilitate the Trade and Vehicle Owners to Find Suitable Mechanics

10. The Vehicle Maintenance Registration Unit under EMSD is responsible for the promotion, general management and operation of the Voluntary Registration Scheme for Vehicle Mechanics and the Voluntary Registration Scheme for Vehicle Maintenance Workshops. Under the Scheme for Vehicle Mechanics, those with the necessary qualifications and/or experience may apply to become registered vehicle mechanics so that their qualifications and skills can be recognised. While registered vehicle mechanics are divided into different categories based on the types of repairs they provide, there is no category for inspection and repairs of vehicle emission systems. EMSD indicates that it has no role in the implementation of the New Measure and the departments concerned have not consulted it on the registration of vehicle mechanics or the question of maintenance skills.

11. We consider it necessary to include emission-related repairs in the service categories provided by registered mechanics to ensure that the vehicle maintenance trade has adequate skills in repairing vehicle exhaust systems. Not only would this assist the trade to estimate the demand for mechanics with related skills, it would be easier for vehicle owners to find the right people to repair their vehicles. Vehicle owners will not know what to do if they cannot get timely service from mechanics with related skills. Besides, the effectiveness of the New Measure may thus be compromised. Although registration of vehicle mechanics is currently on a voluntary basis and not mandatory, the registration information may to some extent reflect the availability and types of skills of mechanics which should be useful for the planning and promotion of the

implementation of this New Measure. In case the information shows a shortage of mechanics with the required skills in emission-related repairs, the Government should organise with relevant training organisations (e.g. VTC) more training courses on repairs in order to enhance the technical skills of members in the trade.

(B) Lack of Publicity and Unclear Information

(4) Publicity for the New Measure Failing to Address Concerns of Interested Parties (Especially Vehicle Owners and the Maintenance Trade)

12. Nowhere in the print advertisements including publicity posters and leaflets or the TV commercial has EPD conveyed the most important message to the recipients: “it is possible that vehicles which have passed the annual vehicle examination may still be found emitting excessive exhaust by remote sensing equipment and fail in the treadmill test”. Rather, the advertisements merely tell the public about “strengthened control of exhaust emissions”, without giving any details as to how it is to be done or how it differs from the annual vehicle examination. The TV commercial has not even mentioned which kinds of emissions are targeted by the treadmill test. Moreover, without explaining the most important message, the Frequently Asked Questions in the leaflet on the New Measure contains only one question which points out that the annual examination does not include any NO_x testing and therefore cannot be a substitute for the treadmill test.

13. We considered that the publicity information on the New Measure is not clear and precise and may easily cause misunderstanding. In fact, this may explain why some members from the vehicle maintenance trade have commented that they mistook the New Measure to be something similar to the idle emission test. Obviously, the Government has failed to provide information that interested parties, especially vehicle owners and the trade, would find useful.

(5) No Relevant Information Available on TD’s Website

14. TD is responsible for issuing and cancelling vehicle licences, which means it can determine whether a vehicle could still be on the road. Therefore, it plays a major role in the implementation of the New Measure. TD is also the Government department that vehicle owners are most frequently in touch with. Taking a one-government approach, TD and EPD should work together in promoting the New Measure so that vehicle owners can learn sooner and more easily about the arrangement for the New Measure and their obligations (such as having their vehicles maintained properly). The most important thing is to remind vehicle owners that “passing the annual vehicle examination does not mean a vehicle can also pass EPD’s emission test by remote sensing equipment and the treadmill test”. However, we cannot find even a simple leaflet on TD’s website, let alone information about the implementation of the New Measure. This shows inadequacies on the part of TD.

(C) Inadequate Coordination between the Departments

(6) Ineffective Coordination between the Two Departments on Inclusion of Treadmill Test in Annual Examination

15. The annual vehicle examination that TD conducts on vehicles does not cover NO_x emission test. Besides, the standards for carbon monoxide and hydrocarbons emission testing in the annual examination also differ from those in the treadmill test.

16. To resolve the difference in standards of exhaust emissions between the annual examination and the treadmill test, the most direct way is to raise the standards of the former to the same level as the latter in exhaust emission tests such that the practice will be consistent with the New Measure. This was noted in the discussion papers of the Panel on Environmental Affairs of the Legislative Council (“LegCo”) on 27 February 2012 and 23 June 2014. Paragraph 8 of the paper submitted to the Panel by EPD on 23 June 2014 (i.e. two months before the implementation of the New Measure) states that “*TD will upgrade the idle emission test in its vehicle annual examination to the dynamometer-based emission test. EPD and TD are discussing with the privately-run Car Testing Centres (“CTCs”) about the upgrading of the emission test. At present, there are 22 CTCs. Subject to the availability of the equipment and space for conducting the dynamometer emission test, some of the CTCs might be ready to include the new emission test in their vehicle annual examination in 2016 or 2017.*” This shows that the Government’s implementation of the New Measure aims to include the NO_x test in the annual examination.

17. Nevertheless, TD presents a different view on whether the treadmill test should be included in the annual vehicle examination. TD opines that “not roadworthy” and “exceeding the vehicle emission standards” are two different concepts. Therefore, in principle, NO_x testing should not be included in the annual examination. For the convenience of vehicle owners, however, the arrangement should be having the annual examination and emission test conducted at the same time and the same venue where practicable. TD believes that one feasible way to achieve this objective is to have EPD issue a notice to those private car owners whose vehicles should go through the annual examination before their licences can be renewed. The owners can then make an appointment for the annual examination and emission test to be conducted at the same time and the same centre. In so doing, vehicles are still required to go through both the annual examination and the treadmill test; but in practice, the owners need simply to arrange for one examination, without going through duplicated procedures. This would, according to TD, achieve the effect of including the treadmill test in the annual examination.

18. The above shows that, although the timeline given in our investigation report may suggest that TD has adopted the same approach as EPD for the implementation of the New Measure, in fact the two departments’ positions are different. It is doubtful whether they have been coordinating effectively with each other in the implementation of the New Measure.

19. From our perspective, if this latest view of TD is to put into practice, it would mean that the annual examination still does not include the treadmill test. Currently, the annual exhaust emission test is not required by law. Unless the relevant legislation is amended to require all vehicle owners to arrange for an annual emission test in addition to the annual examination, EPD has no authority to issue an ETN to require a vehicle owner to arrange for the treadmill test if the vehicle concerned is not found to have excessive emissions. The only thing that EPD can do is to send the owner a cordial reminder. It is difficult to assess whether the setting up of an emission test centre at the same venue can encourage the majority of vehicle owners to put their vehicles through an emission test while undergoing the annual examination. Therefore, whether this arrangement can serve its purpose is uncertain.

20. Furthermore, if most of the vehicle owners really make the treadmill test a concurrent arrangement with the annual examination, the annual examination will take an extra 20 minutes to complete. This may require a significant increase in the capacity of the existing 22 DCTCs to cope with the demand. As the number of vehicles to be examined is increasing every year, EPD and TD should give careful consideration to the capacity of the DVETCs and DCTCs regardless of the future arrangement for the New Measure.

21. We consider that EPD should work proactively with TD to resolve their differences in implementing the New Measure and clarify as soon as possible the direction and specific arrangements in the implementation. They should also review the long-term strategy and principle with the relevant policy bureaux in this regard, or else the effectiveness of the New Measure would be compromised.

(D) Failing to Adequately Consider the Ancillary Facilities for Implementing the New Measure

(7) Failing to Solve Early the Problem of Installing Treadmills at DCTCs

22. As early as 2011, EPD had studied the feasibility of installing treadmills at a site in Kowloon Bay for testing of commercial vehicles, but the plan was not followed through. Moreover, in April 2012 EPD allocated funds to TD for commissioning a consultant to study the feasibility of installing treadmills at TD's DCTCs or other locations. Evidently, both departments were aware that sufficient space and suitable conditions are required for installation of treadmills, but the issue had not been properly dealt with before implementation of the New Measure. As a matter of fact, in March 2014 (i.e. six months before the launch of the New Measure), some DCTCs already indicated to EPD that they would not have space for installing treadmills. However, in the paper submitted to the LegCo Panel on Environmental Affairs in June 2014, the Environment Bureau/EPD did not mention the issue of finding space for installing treadmills. They merely stated that subject to the availability of facilities and space for conducting the treadmill test, some of the DCTCs might be ready to include the new emission test in the annual vehicle examination in 2016 or 2017. It was not until

August 2015 (i.e. one year after the launch of the New Measure) that TD's consultant completed the report, which concluded that among the 22 DCTCs, only five would be able to install treadmills.

23. At present, EPD and TD are still following up on the issues raised by the DCTC operators. There is no specific timetable at the moment for installing treadmills at any DCTC, and none of the DCTCs has the capacity to conduct the treadmill test.

24. As the proposal of conducting emission test with treadmills was made as early as 2002, we consider that the Government should have enough time to study ways of allocating land to install treadmills and inviting more operators to participate. It should also have enough time to assess the availability of space in existing DCTCs for installing treadmills. Nevertheless, since the commencement of preparatory work for the New Measure in 2011, the departments concerned have failed to liaise early with the maintenance trade to come up with a solution.

(8) Under-utilisation of DVETCs

25. To install a treadmill and other related equipment, an area of at least 120 square metres is required. The availability of space is an important factor that DCTC operators would consider in deciding whether to install treadmills. Nevertheless, besides the circumstantial factors of a DCTC itself (such as its scale and proximity to residential areas), cost is also a factor for DCTC operators to step back from installing treadmills.

26. There is information showing that a treadmill may cost up to around \$1.6 million to \$2.4 million, with a service life of six years, while the operating costs (covering manpower, rent, etc.) of a DVETC is around \$230,000 to \$240,000 per month. It can be seen from the statistics cited in our investigation report that between September 2014 and April 2015, only about 1% of the vehicles scanned (by the remote sensing equipment) have been issued an ETN by EPD. The number of ETNs issued was actually on the decline from May to August, take for instance March and April 2015, during which the largest number of ETNs (i.e. 660 ETNs each month) had been issued. Assuming that there were 20 working days in each of these two months, an average of 33 vehicles would have undergone the emission test each working day. If each of the four DVETCs took up the same number of test cases, then each handled only eight cases per day on average. That was far below their maximum capacity of 32 test cases per day.

27. The fee for an emission test for petrol and LPG vehicles had been increased from \$310 to \$465 on 1 August 2015, and would be further increased to \$620 on 1 February 2017. Yet, given the current operating costs of a DVETC and the number of vehicles tested, we believe that the costs could hardly be recovered. If the situation continues, it is really questionable whether anyone in the vehicle testing trade would be interested to invest further into the provision of emission test service. We can see that EPD may be facing a dilemma: while the existing DVETCs cannot possibly handle the

sharp increase of cases if the NOx test is included in the annual vehicle examination, the current arrangement means that the DVETCs are being under-utilised and this would compromise the effectiveness of EPD's implementation of the New Measure in the long run.

28. We consider that before NOx testing becomes part of the mandatory annual examination, EPD should, in order to promote the importance of proper vehicle maintenance, devise incentive measures to encourage vehicle owners to take their vehicles to a DVETC for the NOx test and other emission tests. In this way, the vehicle owners would become aware of the problem of excessive emissions at an early stage and arrange for repairs, thus reducing the chance of their vehicles being identified as having excessive emissions on the roads. This would in turn contribute to a cleaner environment. Besides, such measures can improve the sustainability of the existing DVETCs and would be of great help to the policy which aims at reducing emissions.

Recommendations

29. In the light of the above, The Ombudsman has made the following improvement recommendations to the **Government**:

Coordination between EPD and TD

- (1) **EPD** should restart its discussion with **TD** on the interrelationship between NOx testing and the annual vehicle examination and ensure that both departments work for the same goal. They should also review with the relevant policy bureaux the long-term strategy and principle in implementing the New Measure such that a specific schedule for implementing such strategy and principle can be drawn up as soon as possible.
- (2) Besides requiring new DCTCs to reserve enough space for installing treadmills, **EPD** and **TD** should set out a timetable for existing DCTCs that can be retro-fitted with treadmills to proceed with the installation, and provide support to them where needed.
- (3) **TD** should actively consider how to speed up its approval for new DCTCs which have space reserved for installing treadmills. It should also study with **EPD** ways to ensure that these new centres will have treadmills installed at an appropriate time for conducting emission tests.
- (4) **TD** and **EPD** should closely follow up on the progress of the task force (comprised of representatives from the two departments and DCTC operators) on its assessment of the impact on the time and space needed for the annual vehicle examination should the treadmill test be included as part of the annual examination.

To Enhance Training and Support for the Maintenance Trade

- (5) **EPD** should strengthen its cooperation with the training organisations for the trade (such as VTC, universities and other professional bodies) to organise more courses and provide stronger technical support to help members in the trade to master the skills of emission-related repairs.
- (6) **EPD** should discuss with EMSD whether to add mechanics specialised in emission-related repairs as another category of registered vehicle mechanics in order to ensure that members in the trade are equipped with the relevant technical skills. This would also help vehicle owners to find mechanics with the required expertise to repair the exhaust system of their vehicles.
- (7) **EPD** should provide more financial or technical support to the vehicle maintenance trade for carrying out emission tests, so that they can measure the emissions level of vehicles by installing treadmills or with other portable devices that can detect NO_x emissions. The Department should also help them obtain information on vehicle maintenance and repairs, such as the repair manuals of different vehicle models.

To Step up Publicity and Promotion

- (8) Before the annual examination can be upgraded to include NO_x testing, **EPD** should step up publicity regarding the New Measure, especially the treadmill testing method. Vehicles owners should also be alerted to the fact that even if their vehicles have passed the annual examination, they may still fail in the treadmill test.
- (9) **TD** should take action to promote the New Measure to the public (for example, it can provide relevant information on its website and at its Licensing Offices) to ensure that vehicle owners are aware of the operation of the New Measure and their own maintenance responsibility.

To Ensure Sustainability of DVETCs

- (10) **EPD** should watch closely the operation of existing DVETCs and provide support where necessary. It should also make advance planning lest the effectiveness of the New Measure would be compromised if any such centres encounter difficulties in business operation.

- (11) **EPD** should consider formulating measures to provide incentives to vehicle owners (e.g. a vehicle testing fee subsidy) so that they would be encouraged to take their vehicles for an emission test. This would certainly boost the effectiveness of the New Measure.

Office of The Ombudsman
January 2016