For discussion on
5 November 1999

Legislative Council
Panels of Environmental Affairs and Transport

Comprehensive Control of Diesel Vehicle Emissions

Introduction

This paper sets out the present plan for controlling emissions from diesel vehicles.

Background

2. There are about half a million vehicles in Hong Kong. Nearly 30% of the fleet are diesel-powered, compared with only 17% in Singapore, 10% in the UK and 4% in the United States. More importantly, diesel vehicles share nearly 70% of the total distance travelled on our roads. As a result, diesel vehicles account for 98% of the respirable suspended particulates and around 80% of the nitrogen oxide emitted by vehicles. Given that vehicles are running within the urban area and in the streets, which are often narrow and surrounded by buildings, diesel vehicles are the dominant source of air pollution in the streets of Hong Kong. Furthermore, emission of smoke and odourous fumes from diesel vehicles also cause nuisances to pedestrians. Therefore, the reduction of emissions from diesel vehicles is very important to prevent and abate air pollution in our urban centres.

3. Emissions from diesel vehicles can be reduced by a combination of measures. Our strategy is:

(a) to introduce practical and clean alternatives to diesel vehicles;

(b) adopt the most stringent vehicle and fuel standards once they are available;

(c) adopt practical technology to mitigate emissions from the existing vehicle fleet; and

(d) ensure proper maintenance of in-use vehicles through a combination of voluntary and regulatory measures.

To implement this strategy, there are a wide range of on-going and new measures. These are described in more detail below.

Taxis

4. There are about 18,000 diesel taxis in Hong Kong and they are contributing to 26% of the particulates and 12% of nitrogen oxides emitted by the vehicle fleet. Our intention is to replace all diesel taxis with LPG taxis which could reduce up to 25% of particulates and 6% of nitrogen oxides from existing vehicle fleet. We last briefed Members on the progress of the scheme at the joint panel meeting on 6 July 1999. The Chief Executive has set out in the 1999 Policy Address our intention to provide a one-off grant to assist owners to switch to LPG taxis and specific targets. These new measure will complement the ones which we have announced in the past months to facilitate the comprehensive provision of the supporting services at reasonable costs. These include:

(a) no duty shall be imposed on auto-LPG;

(b) subject to funding approval by the Finance Committee, an one-off grant of $40,000 will be made available to all diesel taxi owners who choose to replace their diesel taxis with LPG taxis before or during 2001. In 2002 and 2003, the same grant will be offered to owners of diesel taxis of 6 years old or below at the time they choose to replace their diesel taxis with LPG taxis;

(c) five government sites will be put out to tender for use as dedicated LPG stations at nil premium. These sites will be awarded to whichever tender is able to provide facilities by 1 January 2001 and to offer a fixed LPG price during the first year of operation and a formula that sets the lowest price of LPG after the first year of

operation;

(d) lease incentives are being offered for existing petrol filling stations which can provide specified number of LPG facilities and to sell auto-LPG based on similar pricing mechanism as for the dedicated LPG filling stations;

(e) in anticipation of a substantially higher growth in the number of LPG taxis over the next two to three years, the oil companies have agreed to step up their construction programmes of LPG refilling facilities. Four temporary LPG refilling stations are now in operation and the oil companies have agreed to increase the re-supply of LPG at these stations in order to allow additional LPG taxis to make use of these facilities. We also expect to put out to tender shortly the five sites for dedicated LPG refilling stations. They are expected to commence operation from the last quarter of next year. In addition to the temporary and dedicated sites, the oil companies have indicated their intention to provide LPG refilling facilities in at least 17 existing or new petrol filling stations over the next year and another 9 in the year 2001. We will also put out to tender 2 new petrol cum LPG filling stations as part of this year's Land Sales Programme. These stations are expected to be complete in 2001. Altogether we expect there will be at least 26 LPG refilling stations by end 2000 and at least 37 by end 2001. A map setting out the general location of these stations is at Annex. We are in discussion with the oil companies on ways to expedite the provision of these stations and to increase the number of LPG stations commensurate with the anticipated growth of LPG vehicles. We aim to provide Members with additional information once the oil companies have provided more details;

(f) suitable land within 4 industrial sites in Kowloon Bay, Tsing Yi, Kwai Chung and Yuen Long scheduled to be let out in this year Land Sales Programme have been made available for the provision of LPG workshops at these sites. The site in Tsing Yi will be reserved for the sole purpose of LPG vehicle workshops and ancillary services. Permission will also be given to another two

industrial sites in Sai Kung and Sheung Shui in the same Programme for setting up LPG workshops within them. In addition, we have received 11 applications from existing vehicle workshops to be registered as LPG vehicle workshops. Two applications have been approved and the others are under processing; and

(g) free training to become LPG vehicle mechanics is being provided by the Vocational Training Council (VTC). The plan is to train 180 mechanics each year to meet the trade demand on LPG vehicle mechanics. So far, 148 LPG vehicle mechanics have been trained by VTC and 88 mechanics have been registered as competent persons under the Gas Safety Ordinance.

5. The package of measures above is designed to assist diesel taxis to make an early switch to the cleaner LPG taxis. We are confident that the above measures will help to provide a favourable environment for taxi owners to switch to LPG. We have announced in October 1998 our intention to require all new taxis to use LPG from 1 January 2001 and to phase out all diesel taxis as soon as possible. To provide a firm target for all parties to work towards, we propose to de-register all diesel taxis over 7 years old from 1 January 2004 and the remaining diesel taxis by 1 January 2006. We will continue to work with the trades and take all necessary steps to ensure that the supporting infrastructure required to support these targets will be put in place.

Light Buses

6. There are about 6,400 diesel light buses including public, private and school light buses in Hong Kong. They contribute to 5% of the respirable particulates and 3% of the nitrogen oxides emitted from the vehicle fleet. All new diesel light buses in Hong Kong have been required to meet the corresponding Euro II standard. We are consulting the light bus trades to put up a 6-month trial of clean alternative light buses starting April 2000. The experience of the LPG taxi trial tells that LPG light buses will likely be a viable clean alternative to diesel light buses. However, we wish to maintain an open mind on other clean alternative options and intend to include any other possible

options such as electric light buses in the trial.

7. If the trial is successful, we will discuss with the trade on how to replace diesel light buses with clean alternative light buses.

Light Diesel Vehicles

8. Apart from taxis and light buses, there are 70,000 other diesel light goods vehicles (up to 5.5 tonnes in weight) in Hong Kong and they are contributing to 25% of the respirable particulates and 13% of the nitrogen oxides emitted from the vehicle fleet. All new light goods vehicles in Hong Kong have been required to meet the corresponding Euro II standards. To further reduce the emissions, we are planning to adopt the Euro III standards once these vehicles are commercially available. We will do this at the same time as the European Union which intends to introduce these standards in 2001.

9. There are however 50,000 light goods vehicles imported before the Euro I standards came into effect in 1994. A pre-Euro vehicle could emit up to 80% more particulates than those emitted by a Euro II vehicle. To reduce the smoke and particulates emitted from these older vehicles, we are running a trial together with the Hong Kong Polytechnic University of using a low cost diesel particulate trap (suitable for vehicles up to 4 tonnes) which can reduce smoke and particulates by about 20%. Government is also starting a trial on installation of diesel catalytic converter on pre-Euro light goods vehicles between 4 to 5.5 tonnes. Subject to the outcome of this trial, our intention is to discuss with the trade a plan to provide free installation of particulate traps or diesel catalytic converters (depending on the vehicle weight) to all these vehicles in 2001 and to make this a requirement for all pre-Euro light duty vehicles after a specified date. This plan should apply to all pre-Euro light duty vehicles including pre-Euro diesel taxis and light buses before they are switched to LPG or other clean vehicle models.

Buses

10. There are 12,000 buses (including franchised, public and private buses)

in Hong Kong and they contribute to 12% of the respirable particulates and 18% of the nitrogen oxides emitted from the vehicle fleet. Just like the light duty diesel vehicles, all new buses in Hong Kong have been required to meet the relevant Euro II standards. We are also planning to require new buses to meet the Euro III standards as soon as they come into effect in the European Union in 2001.

11. To further reduce emissions from buses, the franchised bus companies have agreed to retrofit in next 2 years some 2000 pre-Euro standard buses with diesel catalytic converters that can reduce the emission of smoke and particulates from individual vehicles by up to 50%. The franchised bus companies also plan to scrap most of their older buses over the next three years. All replacement buses will be new models which meet the latest emission standards. In addition to the above, the Transport Department is also continuing with its programme to rationalize bus services and re-organize bus stops in busy areas to reduce congestion, improve traffic flow and reduce pollution.

12. To reduce the emissions of smoke and particulates from public and private buses, we are starting a trial of retrofitting those buses imported before the Euro I standard came into effect with diesel catalytic converters. There are about 3,400 such buses now in operation. Subject to the outcome of this trial, we will discuss with the trade on a plan to provide free installation of diesel catalytic converters to such vehicles and to make this a requirement for them after a specified date.

Medium and Heavy Diesel Vehicles

13. There are about 40,000 medium and heavy diesel vehicles in Hong Kong and they contribute to 30% of the respirable particulates and 30% of the nitrogen oxides emitted from the vehicle fleet. We have required all new medium and heavy diesel vehicle to meet the corresponding Euro II standards. Just like all other diesel vehicles, we are planning to introduce the Euro III standards for the new medium and heavy diesel vehicles as soon as they come into effect in the European Union in 2001. To further reduce the emissions of smoke and particulates from the 30,000 medium and heavy diesel vehicles

imported before the Euro I standard came into effect, we are starting a trial of retrofitting these vehicles with diesel catalytic converters. Subject to the outcome of this trial, we will discuss with the trade on a plan to provide free installation of diesel catalytic converters to such vehicles and to make this a requirement for them after a specified date.

Vehicle Age Limits

14. Because of technological development, new diesel vehicles will be cleaner. Hence air pollution from the diesel vehicle fleet can be reduced if the older diesel vehicles are to be replaced by new diesel vehicles. To achieve this, we are considering the feasibility of introducing appropriate age limits for different categories of vehicles. Our plan is to put forward a proposal next year for wide consultation with the trades and the community.

Diesel Fuel

15. We have been improving the quality of motor diesel in Hong Kong. Our current motor diesel fuel (0.05% sulphur) is the best in Asia and is of the same quality and specifications as required by the European Union and in North America. Together with the introduction of Euro III standards, we intend to reduce the sulphur content of motor diesel to not more than 0.035% in January 2001. We are also seeking to introduce ultra low sulphur diesel to Hong Kong (with sulphur content of 0.005%) which can reduce up to 30% particulates and 5% nitrogen oxides from vehicles using it. Several franchised bus companies have indicated interest to try using this diesel and one of them will start a trial later this year.

Emission Control

16. For individual diesel vehicles, proper maintenance is of paramount importance to keep its emissions to the practical minimum and to prevent the emission of smoke. Preventive inspection and suitable enforcement are

necessary. At the moment, all commercial vehicles are required to undergo a smoke emission check as part of their annual roadworthiness inspection and 10% will be selected for strengthened examinations. To spot smoky vehicles on the roads, we are implementing a Smoky Vehicle Control Programme and the Police are also from time to time issuing fixed penalty tickets to smoky vehicles.

17. To enhance the effectiveness, we introduced in September this year an advanced smoke test (by means of dynamometers) for light duty smoky vehicles spotted under the Smoky Vehicle Control Programme. A pilot scheme is being conducted to use similar technology for heavy diesel vehicles. Our plan is to introduce the technology to also heavy diesel vehicle next year. We will also conduct strengthened smoke tests as part of the annual inspection programme of all commercial vehicles.

Education and Training

18. To promote proper maintenance and help the vehicle service trade to familiarize with the use of dynamometers, we are holding a number of seminars and workshops. We will be working with the Vocational Training Council and the vehicle service trade to explore on ways to further assist the trade to improve the service standards. Furthermore, we have also prepared publication materials to promote good driving habits.

Clean Alternative Vehicles

19. In addition to the above, we are monitoring the development of any clean alternative technology that can be put into practice in Hong Kong. At the moment, there are people and companies showing interests in introducing technologies such as bio-diesel, electric vehicles, hybrid vehicles, compress natural gas vehicles as well as trolley buses. We welcome all these initiatives and will offer appropriate help and assistance to facilitate these technologies to be introduced and tried to demonstrate and establish their applicability and viability in Hong Kong.

Way Forward

20. If the above measures can be implemented, they would be able to bring about an overall reduction of particulates and nitrogen oxides emitted from all motor vehicles by 80% and 30% respectively around 2005. This will result in substantial and observable improvements in the smoke and fumes experienced in the street. The measured ambient level of respirable suspended particulates and nitrogen oxides will also improve. We expect the ambient levels of respirable suspended particulates and nitrogen oxides will be improved by about 35% and 20%.

21. We are now working on the details of the above plans and proposals. To bring these measures into implementation, the support of Members, the relevant trades and the community are essential.

Planning, Environment and Lands Bureau
November 1999

Annex

(附件)

Potential LPG Filling Network by 2000/2001

2000/2001年有可能提供的石油氣加氣站網絡