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For information

Managing Air Quality in Hong Kong

Purpose

This paper informs Members of the progress of the comprehensive programme to reduce motor vehicle emissions announced in the 1999 Policy Address and the joint effort of the Hong Kong SAR Government and the Guangdong Provincial Government to improve air quality in the Pearl River Delta Region.

Programme to Reduce Motor Vehcile Emissions

2. To arrest the deterioration of roadside air quality, we announced in the 1999 Policy Address a comprehensive programme to reduce motor vehicle emissions. We anticipate that the programme will reduce the respirable suspended particulate (RSP) and nitrogen oxide (NOx) emissions from motor vehicles by 80% and 30% respectively by end-2005. Paragraphs 3 to 10 below set out the various measures in the programme and the progress that has been made.

Replace diesel taxis with LPG ones

3. There are about 18 000 taxis in Hong Kong. To encourage early replacement of diesel taxis with LPG ones that are environmentally cleaner (an LPG taxi virtually emits zero RSP and its NOx emission is at least 50% lower than that of its diesel counterpart), we launched in August 2000 an incentive scheme under which an owner who had his diesel taxi replaced with an LPG one would get a one-off grant of $40,000. To make the scheme more attractive, motor LPG has been duty-free. The replacement programme is comprehensive, as we have amended the relevant legislation to require all newly registered taxis to run on either LPG or petrol. As the latter is significantly more expensive to operate because of a higher fuel cost, we do not expect there will be any petrol taxi in Hong Kong. At the end of the incentive scheme on 31 December 2003, nearly all diesel taxis (about 99.8%) had been replaced with LPG ones. Those remaining diesel taxis will have to be replaced by LPG or petrol ones when they retire.

Replace diesel light buses with LPG or electric ones

4. As from August 2002, we have been implementing another incentive scheme to encourage early replacement of diesel light buses with LPG or electric ones. Under the scheme, a diesel public light bus owner who replaces his vehicle with an LPG or electric public light bus is entitled to a one-off grant of $60,000 or $80,000 respectively. A diesel private light bus owner who replaces his vehicle with an LPG or electric private light bus is entitled to exemption of First Registration Tax for his new vehicle. To encourage early replacement, owners of diesel light buses aged 10 or above at the time of replacement have to replace their vehicles by the end of 2004 and the deadline for the other owners is end-2005. Since the introduction of the incentive scheme, nearly 80% of newly registered public light buses are LPG ones.

More Stringent Motor Fuel

5. As it is impracticable to replace other in-use diesel vehicles with the environmentally cleaner LPG ones, we introduced a duty concession for ultra low sulphur diesel (ULSD) in July 2000 to encourage its introduction to Hong Kong. Within two months from the introduction of the duty concession that made the price of ULSD competitive with that of ordinary diesel, ULSD became the only motor diesel available at retail petrol filling stations in Hong Kong. A few months later, all franchised buses also switched to the cleaner fuel, which could reduce the RSP and NOx emissions of a vehicle by 15% and 5% respectively. Since April 2002, ULSD has become the statutory motor diesel standard in Hong Kong, three years ahead of the European Union's schedule. ULSD, with a maximum sulphur content of 0.005%, is cleaner than the standard motor diesel now used in all other parts in Asia, Australia, New Zealand and many places in Europe and North America.

More Stringent Motor Vehicle Emission Standard

6. We started introducing Euro III emission standards in 2001 for newly registered motor vehicles in step with the European Union. Our requirements for the emissions of newly registered vehicles are among the most stringent in Asia.

Retrofit In-use Vehicles with Emission Reduction Devices

7. Diesel vehicles are the dominant source of emissions from the motor vehicle fleet. Among them, pre-Euro diesel vehicles, which were first-registered before April

1995, are significantly more polluting than newer diesel vehicles meeting the prevailing Euro III standard. For instance, a typical pre-Euro diesel vehicle emits 7 times more RSP than an equivalent Euro-III model.

8. We implemented in 2001 a programme to retrofit pre-Euro light diesel vehicles with particulate traps or catalysts that can reduce their RSP emissions by at least 30%. About 80% of the eligible vehicles participated in the retrofit programme. Such devices have now become mandatory for this category of vehicles.

9. We started a similar programme to retrofit pre-Euro heavy diesel vehicles in December 2002. Nearly 60% of these vehicles have now been installed with catalysts under the programme. We will make the devices mandatory for this category of vehicles after completion of the programme around end-2004.

Enforcement against smoky vehicles

10. The fixed penalty for smoky vehicles has been increased from $450 to $1,000 since December 2000. We now require all commercial vehicles to undergo a smoke test in the annual roadworthiness inspection. We have also introduced an advanced smoke test for all diesel vehicles reported by spotters, and organised seminars and workshops for vehicle mechanics to promote the importance of reducing emissions through proper engine maintenance.

Improvement to Roadside Air Quality

11. With the implementation of the comprehensive programme to reduce motor vehicle emissions thus far, the RSP and NOx emissions from motor vehicles have been reduced by 63% and 28% respectively. The average concentrations of RSP and NOx at the roadside have dropped by 13% and 23% respectively as compared with 1999. The number of hours of Air Pollution Index recorded at the roadside air quality monitoring stations exceeding 100 has dropped by 35%. The number of smoky vehicles has also reduced substantially by more than 70%.

Improving Regional Air Quality

12. While air quality at the roadside has been improving, the ambient air pollution problem remains serious. This is more noticeable when certain meteorological conditions prevail over Hong Kong, causing accumulation of air pollutants from the Pearl River Delta Region. For instance, temperature inversion can trap air pollutants in the

lower atmosphere. Still wind conditions can hinder effective dispersion of air pollutants. While the number of hours of Air Pollution Index recorded at the roadside air quality monitoring stations exceeding 100 has dropped by 35% compared with 1999, the same for the general air quality monitoring station has increased by 8%. Arresting the deterioration of regional air quality remains a challenge.

Working with Guangdong

13. Air pollutants recognise no boundary. To tackle this challenge, Hong Kong and Guangdong must work together. On this front, the Hong Kong SAR Government and the Guangdong Provincial Government reached a consensus in April 2002 to reduce, on a best endeavour basis, by 2010 the regional emissions of sulphur dioxide (SO_2), NOx, RSP and volatile organic compounds (VOC) by 40%, 20%, 55% and 55% respectively, using 1997 as the base year. Achieving the targets will enable Hong Kong to meet its current air quality objectives. The problem of smog will also be significantly reduced.

Regional Air Quality Management Plan

14. The two Governments have set up a "Pearl River Delta Air Quality Management and Monitoring Special Panel" under the Hong Kong/Guangdong Joint Working Group on Sustainable Development and Environmental Protection to work out a regional air quality management plan for achieving the emission reduction targets. The Special Panel will also monitor the regional air quality and analyse the effectiveness of the improvement measures to be implemented.

15. The regional air quality management plan has now been drawn up. It includes the introduction of enhanced air pollution control measures, the compilation of an inventory of the air pollution emissions in the Pearl River Delta Region and the setting up of a regional air quality monitoring network. The details of the enhanced pollution control measures to be implemented in Hong Kong and Guangdong are set out at the Annex.

Emissions Trading

16. Emissions trading is one of the possible tools for local power stations to meet the reduction targets of the three relevant pollutants (i.e. SO_2, NO_x and RSP) in a more cost effective manner and thus with a smaller implication for electricity tariffs. We have already obtained the support of the State Environmental Protection Administration for introducing an emissions trading pilot scheme among the power stations in Hong Kong

and the rest of the Pearl River Delta Region. We are now working with our Guangdong counterparts on the relevant issues relating to the pilot scheme with an aim to have it set up within three years.

Environment, Transport and Works Bureau
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Annex

Enhanced Control Measures of the Hong Kong SAR

Measure	Implementation Programme
Encourage the replacement of diesel light buses with light buses using cleaner fuels	Programme has started since the third quarter of 2002 to provide incentives to encourage early replacement of diesel light buses with ones that are run on liquefied petroleum gas (LPG) or electricity.
Require the retrofitting of particulate removal devices on pre-Euro diesel vehicles	Programme providing financial assistance to retrofit pre-Euro light diesel vehicles with particulate removal devices has been completed and the installation has been made mandatory for those vehicles. Programme providing financial assistance to retrofit pre-Euro heavy diesel vehicles is going on and is expected to complete by end-2004 following which the installation will be made mandatory for those vehicles.
Enhance the vapour recovery systems at petrol filling stations	To introduce proposed legislation into the Legislative Council in 2004 to require the recovery of petrol vapour emitted during vehicle refueling at petrol filling stations.
Tighten the motor fuel standards	To tighten the motor petrol standard to Euro IV by 2005 in parallel with European Union (the motor diesel standard has already been tightened to Euro IV since 2002).
Tighten vehicle emission standards	To tighten the motor vehicle emission standard for newly registered vehicles to Euro IV by 2006 in parallel with the European Union.
Reduce the emission of VOC from printing operations, paints and consumer products	To introduce proposed legislation into the Legislative Council in 2004/2005 to require the labelling of products with VOC contents.
	To introduce proposed legislation into the Legislative Council to reduce the use of products with a high VOC content and to develop VOC emission standards for printing operations.
Reduce emissions from power stations	Set up an effective and flexible mechanism (which may include emissions trading) to control the total emissions of SO_2, NO_X and RSP from power stations to achieve their respective reduction targets by 2010.

Enhanced Control Measures of Guangdong Province

Measure	Implementation Programme
Use cleaner energy	To achieve by 2005 the energy consumption rate of 0.85 tonne standard coal per 10,000 yuan of GDP. To construct by 2010 an energy production and supply system that is safe, stable, economical, efficient and clean.
	To construct an LNG trunk pipeline and carry out the associated works. To complete in 2005 Phase I that will have a capacity of 3 million tonnes/year. To complete Phase II in 2009 that has a capacity of 3 million tonnes/year and to finish construction of a number of LNG power plants.
	To upgrade by 2005 the 500kV dual circuit annular core transmission grid to cater for the transmission of electricity from western provinces.
Control the sulphur contents of fuels	To restrict use of high sulphur fuels. To limit the sulphur content of the fuel oil and coal used in the acid rain control zone to below 0.8% by 2005.
Reduce emissions from coal-fired and oil-fired power stations	To close down small power generation units. After implementation of this measure, the power generation units of capacity above 300MW will make up more than 70% of the total installed generation capacity of the Region by 2005 – an increase by 35% as compared with 2000.
	To finalise by 2005 plans for installing flue gas desulphurization systems at power plants in Shajiao, Huangpu, Taishan and Zhuhai.
	To require all oil-fired and coal-fired power generation units of capacity above 125MW to be equipped with flue-gas desulphurization systems by 2007.
Control emissions from industrial boilers and industrial processes	To phase out coal-fired boilers of capacity less than 2 tonnes/hour in the urban areas of cities. By 2005, to prohibit the use of coal-fired boilers of capacity below 2 tonnes/hour in the built-up areas of major cities, and to require all large and medium-size industrial boilers to install desulphurization systems or adopt clean combustion technologies to reduce emissions.
	To continue to phase out various production technologies or installations that cause serious pollution by emitting sulphur dioxide, smoke and particulates.

Reduce the emission of VOC from paints	To replace paints using VOCs like Xylene as solvents.
Reduce exhaust emissions from motor vehicles	To commence the construction of a regional rapid light-rail system by 2005. To construct expressways in major cities, such as the district expressway in Southern Guangzhou and the Shenzhen-Changping Express Trunk Road.
	To develop green transport by implementing clean vehicle action programmes in major cities within the region. To encourage the use of clean fuels, develop electric vehicles and actively promote the use of advanced clean fuel motor vehicles.
	To require all new motor vehicles to meet emission standards. To step up annual inspection and on-road spot checks of in-use vehicles. To strengthen the control of in-use vehicles with the objective of ensuring that over 90% of motor vehicles in the cities within the region will meet emission standards by 2005.