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For discussion on 10 December 2012

Air Pollutant Emission Reduction Plan up to 2020

PURPOSE

This paper informs Members of the emission reduction plan for the Pearl River Delta (PRD) region[1] up to 2020 as set out in paragraph 9 of the paper.

JUSTIFICATIONS

Significance of the New Emission Reduction Plan

2. In his election manifesto, the Chief Executive has pledged that we will study and set medium and long-term objectives, and further adopt diversified measures to reduce local air pollutant emissions to improve air quality to a level that can meet the new Air Quality Objectives (AQOs).

3. To tackle the regional air quality problem, we have been working in collaboration with the Guangdong Environmental Protection Department (GDEPD) to implement a basket of measures to reduce emissions of four major air pollutants, namely, sulphur dioxide (SO_2), nitrogen oxides (NOx), respirable suspended particulates (RSP) and volatile organic compounds (VOC), in Hong Kong and Pearl River Delta Economic Zone (PRDEZ). The two Governments agreed in 2002 to reduce the emissions of these pollutants by 20 % to 55 % by 2010 as compared with the levels in 1997. We need to agree with GDEPD on a new phase of emission reduction targets to continue improving regional air quality.

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[1] The PRD region covers HKSAR and PRD Economic Zone (PRDEZ).

4. In the 2009-10 Policy Address, the former Administration announced the plan to work with Guangdong Province (GD) to formulate emission reduction proposals for 2010 onwards. Both the Environmental Protection Department (EPD) and GDEPD then embarked on a joint study to map out the new emission reduction targets and plan.

5. In January 2012, the CE-in-Council approved the plan to adopt a set of new AQOs. Subject to enactment of legislative amendments, the new AQOs will take effect in 2014. The implementation of a new emission reduction plan for both Hong Kong and GD is one of the important elements for the attainment of new AQOs in Hong Kong as the pollution level in Hong Kong is subject to regional influence.

The Post-2010 Emission Reduction Plan

The 2010 Baseline

6. Both Hong Kong and GD had assessed their respective emission levels in the year of 2010 based on the latest emission estimation methods and data[2], which are to serve as the baselines for the next phase of emission reduction efforts. 2010 is the target year for the first phase of emission reduction plan agreed in 2002 with 1997 as the baseline year. In this respect, Hong Kong announced on 10 October 2012 the attainment of 2010 emission reduction targets. For GD, the 2010 targets for SO_2, NOx and RSP were met, but not that for VOC. The VOC emission in the PRDEZ had been reduced by 26.2% over the period as opposed to the target of 55%. Over the years, the socio-economic development of the PRDEZ had been rapid. On the other hand, reducing the emission of VOC was difficult as the pollutant had yet to be a target for control under the national policy. Nevertheless, GD has in recent years put extra efforts in introducing local laws and endeavoured to implement control measures. These efforts have reduced substantially the VOC emissions of the PRDEZ. They have also provided the experience and paved way for continuing the emission reduction in future.

Emission Reduction Targets for 2015 and 2020

7. Ozone (O_3) pollution and haze problem are the two major regional air pollution problems. Since SO_2, NOx, RSP and VOC are the key causes of the problems, we

[2] To ensure the compatibility of emission data over the years, both GD and HK have also adopted the latest emission estimation methods and data to adjust the emission levels for 1997.

have agreed with GDEPD that the four pollutants should continue to be the basis for new emission reduction targets and their emission levels in 2010 should form the baseline for the new emission reduction plan.

8. The socio-economic development outlook for the PRD region in the longer term (i.e. 2020) will be more fluid and less predictable than that of 2015 as that is beyond the horizon of the National 12th Five Year Plan. For Hong Kong, some of the new emission reduction measures also require further deliberations and additional resources and / or policy support, which have yet to be secured. Both sides have agreed that while emission reduction targets should be set for 2015, emission reduction target ranges should be adopted for 2020 given that different emission reduction measures would bring different results.

9. When devising the new reduction targets for Hong Kong, we have taken account of the reduction potential of major emission sources as well as the committed and proposed emission reduction measures identified in the AQO Review Consultancy Study. The emission reduction targets for both Hong Kong and PRDEZ are set out in the table below. The two regions set targets according to their own circumstances.

Pollutant	Area	Emission Reduction Targets / Ranges as compared with 2010	
		2015	2020
SO_2	Hong Kong	25%	35 - 75%
	PRDEZ	16 %	20 - 35%
NOx	Hong Kong	10 %	20 – 30 %
	PRDEZ	18 %	20 – 40 %
RSP	Hong Kong	10 %	15 – 40 %
	PRDEZ	10 %	15 – 25 %
VOC	Hong Kong	5 %	15 %
	PRDEZ	10 %	15 – 25 %

10. At the Hong Kong/Guangdong Joint Working Group on Sustainable Development and Environmental Protection (JWG) meeting on 23 November 2012 co-chaired by the Secretary for the Environment and the Director General of GDEPD, the emission reduction plan in paragraph 9 above was approved.

11. It is worthy to note that, while Hong Kong has set higher reduction target for SO_2, the reduction targets for NOx and VOC for Hong Kong are less aggressive than

those proposed by GDEPD. This is because the NOx emissions from the power sector, which accounted for over 36% of the overall NOx emission of Hong Kong in 1997, have been substantially reduced by 52% over the past years through our stringent control measures. VOC emissions from vehicles and VOC-containing products such as paints, consumer products and printing inks, which accounted for over 80% of the overall VOC emissions of Hong Kong in 1997, have been substantially reduced by over 60% over the years. The scope for further reducing the emission of NOx and VOC is thus likely to be smaller in subsequent years. Notwithstanding, our latest projection has suggested that, by meeting the minimum emission reduction targets of the two sides in 2020, the SO_2, NO_2, RSP and O_3 concentration levels of Hong Kong at the ambient level in 2020 should be able to meet broadly the new AQOs.

Air Quality Improvement Measures for Hong Kong up to 2020

12. As for the emission reduction target ranges for 2020, different emission reduction measures would result in different reduction levels. Apart from the 22 air quality improvement measures announced for achieving the new AQOs (see Annex), which form the basis for drawing up the emission reduction targets for 2015, the implementation of additional measures, such as increasing the use of clean fuel or changing fuel mix for power generation, as well as designating PRD waters as an Emission Control Area for vessels by 2020, could possibly bring further reduction.

IMPLICATIONS OF THE PROPOSAL

13. The proposed post-2010 emission reduction plan and the associated air quality improvement measures can further improve the regional air quality by reducing the emission of four major air pollutants below the 2010 levels. The attainment of new AQOs and relevant air quality improvement measures would have substantial benefit to public health. There will also be intangible socio-economic benefits such as strengthening our competitiveness as an international financial centre and tourist destination and attractiveness for investments that can help create jobs and retain talents to work here.

PUBLIC CONSULTATION

14. The emission reduction targets for Hong Kong are primarily drawn up with reference to the package of air quality improvement measures for achieving new AQOs

announced in January 2012. These measures were drawn up based on the result of a thorough public consultation and will be implemented subject to resource availability.

PUBLICITY

15. The Secretary for the Environment will hold a press conference this afternoon to announce the new emission reduction plan. A press release will be issued and a spokesman will be made available for press enquiries.

BACKGROUND

16. To tackle the regional air quality problem, we reached a consensus with Guangdong Provincial Government in 2002 to jointly reduce emissions of four major air pollutants in the PRD region by 20% to 55% by 2010 as compared with those in 1997. To achieve these targets, the two governments have implemented a basket of emission reduction measures under the PRD Regional Air Quality Management Plan.

17. Hong Kong and GD had conducted a joint assessment on achieving the 2010 emission reduction targets and the outcome is as follows-

Pollutant	Area	1997 Emissions (tonnes)	2010 Emissions (tonnes)	2010 Emission Reduction (%) (as compared with 1997)	2010 Emission Reduction Target
SO_2	Hong Kong	82 000	35,500	-56.7%	-40%
	PRDEZ	921 000	507,000	-45%	
NOx	Hong Kong	154 000	108,600	-29.5%	-20%
	PRDEZ	1 114 000	889,000	-20.2%	
RSP	Hong Kong	15 500	6,340	-59%	-55%
	PRDEZ	1 544 000	637,000	-58.7%	
VOC	Hong Kong	81 700	33,700	-58.8%	-55%
	PRDEZ	1 224 000	903,000	-26.2%	

18. We signed an “Environmental Co-operation Agreement between HKSAR and Guangdong” at the Hong Kong/Guangdong Co-operation Joint Conference in August 2009. Both sides agreed to assess the progress of emission reduction in the two places in 2010, and to undertake a joint study to map out the emission reduction targets and plan for the next phase in the PRD region.

Environment Bureau/Environmental Protection Department
November 2012

Annex

Air Quality Improvement Measures

1. Emission Capping and Control

(i) Increasing the ratio of natural gas in local electricity generation to 50% with additional emission abatement measures

Progress: We have tightened the statutory emission caps on the power plants with effect from 2015. To comply with the emission caps, the power sector will have to maximize the use of gas-fired generation units, thereby raising the ratio of natural gas in local electricity generation to 50%, and prioritize the use of coal-fired generation units equipped with advanced emission control devices.

The Technical Memorandum for power plants requires us to review the emission caps every two years. The Third Technical Memorandum was endorsed by the LegCo on 21 November 2012. It will further tighten the emission caps for power plants starting from 2017. We will continue to examine the scope for further tightening the emission caps in the light of the future fuel mix for the power sector and advancement in emission control technologies.

(ii) Early retirement of aged / heavily polluting vehicles

Progress: We completed a subsidy scheme in March 2010 to encourage the early replacement of pre-Euro and Euro I diesel commercial vehicles. Under the scheme, 17,000 vehicles were replaced with our grants, representing about 30% of all eligible vehicles at the commencement of the scheme.

We launched another subsidy scheme for Euro II diesel commercial vehicles in July 2010. As at end October 2012, about 14% of the eligible owners took up the incentive and replaced their aged vehicles.

(iii) Earlier replacement of Euro III commercial diesel vehicles with models meeting latest Euro standards

Progress: The oldest batch of Euro III vehicles will be more than 10 years old by 2012. We will consider introducing suitable measures to accelerate their replacement.

(iv) Wider use of hybrid / electric vehicles or other environment-friendly vehicles with similar performance

Progress: *Government has launched incentive schemes through First Registration Tax (FRT) concession to encourage the use of electric vehicles (EVs), environment-friendly petrol private cars (including hybrid private cars) and environment-friendly commercial vehicles.*

In respect of EVs, we have also been expanding the network of charging facilities and working closely with the manufacturers and dealers to encourage them to bring in their EVs into Hong Kong. As at August 2012, there are about 350 EVs in Hong Kong, increasing from 16 units in end 2009 and 74 in end 2010. The Government and the private sector have also jointly installed around 1,000 standard charging facilities all over the territory for public use.

There are currently 38 hybrid vehicle models available on the local market.

Up to end October 2012, we received about 43,300 applications for environment-friendly petrol private cars (which represented 20% of all private petrol cars newly registered from April 2007) and about 12,000 applications for environment-friendly commercial vehicles (which represented 41% of all commercial vehicles newly registered from April 2008).

As for franchised buses, the 2010-11 Policy Address announced the ultimate policy objective of having zero emission buses running across the territory. In this regard, additional requirements were included in the three bus franchises granted in April 2012 so that the bus companies concerned have to acquire the most environment-friendly buses that are technologically proven and commercially available when acquiring new buses in future, taking into account affordability of the companies and passengers. Similar requirements will be imposed on the three remaining bus franchises upon their expiry in 2016/17. Separately, Government has sought funding for franchised bus companies to procure six hybrid buses and 36 electric buses for trial to assess their performance in different conditions. We expect that the trial can start in 2014.

In addition, Government set up the $300 million Pilot Green Transport Fund in March 2011 to encourage the transport sector to test out green and low-carbon transport technology (including hybrid/electric vehicles). Up to mid-November 2012, 37 applications were approved, which cover trials of electric

buses, goods vehicles and taxis, and hybrid light buses and goods vehicles (amounting to a total subsidy of about $87 million).

(v) Use of 0.05% sulphur diesel for local vessels

Progress: *We completed a trial of local ferries using Ultra Low Sulphur Diesel (ULSD) (i.e., diesel with a maximum sulphur content of 0.005%) in August 2010. The trial confirmed the technical feasibility of ULSD as fuel for local ferries but there will be an increase in fuel cost largely due to the extra handling cost of providing ULSD to a very small number of local ferries. To reduce the cost implications and achieve greater environmental benefits, we have revised the proposal and are seeking the views from the trades and relevant stakeholders to reduce the sulphur content of marine light diesel sold in Hong Kong from the current maximum limit of 0.5% to 0.05% subject to confirmation of technical feasibility.*

(vi) Measures to reduce nitrogen oxides emissions from Government vessels

Progress: *Upon further evaluation, we have found that it would be more cost-effective to replace the existing engines with new ones that comply with the more stringent emission limits, particularly in respect of NOx. To ascertain the technical feasibility and better understand the technical implications, we are working on a trial to replace the existing engines of a few government vessels.*

(vii) Electrification of aviation ground support equipment (GSE)

Progress: *There are currently about 300 units of GSEs and vehicles running on electricity at the Hong Kong International Airport. To facilitate the use of electric GSEs and vehicles in the coming years, the Airport Authority has installed additional electric charging stations and put in place new vehicle purchase policy which favours the use of electric vehicles. The pace of GSE replacement would depend on factors such as the availability of electric alternatives, age and maintenance conditions of the GSE fleet, the financial position of operators and the business outlook.*

(viii) Emission control for off-road vehicles / equipment

Progress: *We have completed the stakeholders' consultation on our revised control proposal for imposing emission standards for newly imported non-road mobile machinery that will be used locally. We are preparing the necessary legislative amendments with a view to effecting the proposed control regime towards end 2013.*

(ix) Strengthening volatile organic compounds (VOC) control

Progress: *Legislation on tightened control enacted. The new statutory VOC content requirements of 14 types of vehicle refinishing paint, 36 types of vessel paint and pleasure craft paint and 47 types of adhesives and sealants have been implemented in phases with effect from 1 January 2010. The last phase came into operation on 1 April 2012.*

2. Traffic Related Measures

(x) Low emission zones

Progress: *We have identified three locations for establishing pilot low emission zones (LEZ) at the busy corridors in Causeway Bay, Central and Mong Kok. Starting from 2011, the franchised bus companies have accorded priority to the deployment of low-emission buses (i.e. those meeting the emission level of a Euro IV or above bus) to routes serving the pilot LEZs as far as possible. Our target is to have only low-emission buses in these zones by 2015.*

(xi) Car-free zone / pedestrianisation scheme

Progress: *As at December 2011, there are seven full-time pedestrian streets, 30 part-time pedestrian streets and over 40 traffic calming streets in Hong Kong. The introduction of further pedestrian streets will be increasingly challenging due to limited road space against competing needs and street management considerations. Our previous consultations with District Councils show that they have hesitations in further expanding the current pedestrianisation scheme. Some District Council members, however, are receptive to the option of adjusting the operation hours of the existing pedestrian streets to maximize the benefits of the scheme.*

(xii) Bus route rationalization

Progress: It is an on-going plan of Transport Department (TD) to review the route development programmes (RDPs) of franchised bus operators each year and rationalization is one of the major areas that needs to be tackled in consultation with the affected District Councils. The objective is to balance the public demand for bus services, the need to improve road traffic and the environment. The Government will continue to work with the District Councils and the franchised bus companies to pursue bus route rationalization so as to reduce the number of bus trips and bus stopping particularly on busy corridors.

3. Infrastructure Development and Planning

(xiii) Expand rail network

Progress: Construction works have commenced for West Island Line, Hong Kong section of the Guangzhou-Shenzhen-Hong Kong Express Rail Link, South Island Line (East), Kwun Tong Line Extension and Shatin to Central Link

(xiv) Develop cycle tracks in new development areas

Progress: The Government's long standing policy is to promote the use of public transport system as the main transport mode and to encourage the public to make use of the highly efficient mass transit transport systems and other public transport services. Due to safety considerations, the Government does not encourage the public to use bicycle as a transport mode in urban areas. Compared with urban areas, new towns in the New Territories or new development areas, where traffic density is relatively low, have better conditions for using bicycle for short-distance travel. Civil Engineering and Development Department (CEDD) is taking forward the development of a cycle track network in the New Territories by phased interconnection of the cycle tracks in various new towns between Ma On Shan, Sheung Shui, Yuen Long, Tuen Mun and Tsuen Wan. It is expected that the Sheung Shui – Ma On Shan section will be completed in 2013. CEDD has recently commenced detailed design and site investigation works for the proposed cycle track between Tsuen Wan and Ting Kau. For existing cycling facilities in new towns, TD commissioned a consultancy in May 2010 to carry out a study to examine measures to improve the existing cycle track networks and bicycle parking facilities. The study is expected to be completed by end 2012.

4. Energy Efficiency Measures

(xv) Mandatory implementation of the Building Energy Codes

Progress: *The Buildings Energy Efficiency Ordinance was enacted and has taken full effect on 21 September 2012. We would continue to keep under review technological developments and tighten the efficiency standards where appropriate.*

(xvi) Energy efficiency standards for domestic electrical appliances

Progress: *The Energy Efficiency (Labelling of Products) Ordinance has been implemented to cover compact fluorescent bulbs, air-conditioning units, refrigerators, dehumidifiers and washing machines. We will continue to review the scope of the products under the Ordinance.*

(xvii) Light-emitting diode (LED) or equivalent alternatives for traffic signal / street lighting

Progress: *Replacement of all conventional traffic signal at 1,800 road junctions with LED light is underway and the works are expected to be completed by end 2012. Trial schemes of LED street lights for minor roads and light tubes at roadside and on footbridges are in progress to assess their cost/benefit and suitability in Hong Kong's outdoor environment. Their performance and cost-effectiveness will be reviewed after completion of the trial in 2012.*

(xviii) Tree planting / skyrise greening

Progress: *Government has all along been promoting active planting and new greening technologies such as skyrise greening (roof greening and vertical greening) for government premises. Development Bureau will continue to formulate and promulgate standards, guidelines and best practices related to greening, landscape planning and design and tree management; and carry out public education and community involvement activities to enhance public awareness of greening, landscape and tree management issues.*

(xix) District cooling system for Kai Tak Development

Progress: *Construction works are underway for Phases I and II of the district cooling system for Kai Tak Development. Phase III of the district cooling system will be subject to the progress and development programme of the Kai Tak Development.*

5. Measures outside the AQOs Review

(xx) Retrofit Euro II and III franchised buses with selective catalytic reduction (SCR) devices to reduce their NOx emissions

Progress: *Government and franchised bus companies commenced a trial in September 2011 to retrofit Euro II and III buses with SCR to reduce their nitrogen oxides emissions. Together with the diesel particulate filters already installed on the buses, this could upgrade the emission performance of the buses to the level of Euro IV bus or above. Subject to satisfactory trial results, Government will fully fund the retrofit of the devices on Euro II and III buses.*

(xxi) Introduce a more stringent regime to control emissions from LPG and petrol vehicles through remote sensing equipment and dynamometer tests

Progress: *We completed the stakeholders' consultation in January 2012 and reported the findings to LegCo in February 2012 with a view to implementing the tightened control regime towards 2014. In parallel, we are drawing up the arrangements for providing a one-off subsidy to owners of LPG taxis and light buses for replacing the catalytic converters in their vehicles to improve their emission performance.*

(xxii) Reduce emissions from the marine sector by adopting cleaner fuels for local vessels, requiring ocean-going vessels (OGVs) to switch to cleaner fuels while berthing at PRD ports and setting up an Emission Control Area (ECA) in PRD waters over the longer term.

Progress: *We are discussing the proposals with the governments of Guangdong, Shenzhen and Macao.*