**For Information**
**August 2006**

# LEGISLATIVE COUNCIL
# PANEL ON ENVIRONMENTAL AFFAIRS

## Progress of Measures to Improve Air Quality, Including Those Taken By The Two Power Companies to Meet The Government's Emission Reduction Targets by 2010

## Purpose

This paper reports to Members the latest progress of measures to improve air quality, including those taken by the two power companies, to meet the Government's emission reduction targets by 2010.

## Background

2. To improve regional air quality, the Government of the Hong Kong Special Administrative Region (HKSARG) reached a consensus with the Guangdong Provincial Government in April 2002 to reduce, on a best endeavours basis, the emission of four major air pollutants, namely sulphur dioxide ($SO_2$), nitrogen oxides ($NO_x$), respirable suspended particulates (RSP) and volatile organic compounds (VOC) by 40%, 20%, 55% and 55% respectively in the region by 2010, using 1997 as the base year. Achieving these targets will not only enable Hong Kong to meet its air quality objectives but also significantly improve the air quality of the Pearl River Delta (PRD) and relieve the regional smog problem.

3. On 29 September 2005, we informed Members of the progress of measures being pursued by both sides for meeting the 2010 emission reduction targets. At the meeting, Members requested the Administration to provide six-monthly reports on the progress of the 2010 emission reduction targets and measures taken by the two power companies to meet the emission reduction targets.

4. Subsequently, the Administration provided its first progress report to Members on 23 January 2006. In addition, we briefed Members on 27 March 2006 on the environmental aspects of the Stage II consultation on the future development of the electricity market in Hong Kong. This paper is the second progress report.

**Progress of Reducing Emissions in Hong Kong**

*General*

5. We are making steady progress in local emissions reduction measures as described as follows –

(a) Since April 2006, all pre-Euro heavy diesel vehicles (except long-idling vehicles) have had to be installed with approved emission reduction devices. The Air Pollution Control (Emission Reduction Devices for Vehicles) Regulation requires that these devices be kept in good working condition for reducing particulate emissions. Owners of vehicles failing to comply with the requirements will have their licences cancelled or refused renewal upon expiry;

(b) We have completed consultation with the transport trades about extending the emission reduction device requirement in (a) to pre-Euro long-idling vehicles;

(c) We have enacted legislation requiring newly registered heavy vehicles to comply with Euro IV emission standards. The tightened emission requirements will come into force in October 2006;

(d) We are preparing for a proposal to strengthen the control of emissions from vehicles running on petrol and liquefied petroleum gas, including by the use of roadside remote sensing equipment and dynamometers for emission testing. The proposal should be ready in early 2007; and

(e) We are about to finalize the draft regulation to introduce direct limit on the contents of VOC in paints, printing inks and selected consumer products, and mandating the installation of emission reduction device in certain printing process. We hope to introduce the regulation into the Legislative Council by end 2006.

*The Power Sector*

6. As mentioned in the Administration's first progress report, electricity generation accounts for 92% of the $SO_2$ and half of the $NO_x$ and RSP emissions in Hong Kong. To meet the 2010 emission reduction targets, it is necessary to effectively reduce the emissions from electricity generation. The following progress has been achieved thus far –

(a) On retrofit projects, we approved the flue gas desulphurization (FGD) system for Hong Kong Electric (HEC) and granted the Environmental Permit for the project on 24 April 2006. For China Light & Power (CLP), we issued an environmental impact assessment (EIA) Study Brief in October 2005 for its FGD and selective catalytic reduction projects. In response, CLP submitted the EIA Report on 21 June 2006;

(b) On the wider use of natural gas, we issued the licence and emission cap for HEC's first gas-fired generation unit, the L9, on 22 June 2006. HEC has completed its first firing by end June 2006. The emissions from HEC should be reduced with its full operation. CLP is preparing for the EIA Report for its proposed liquefied natural gas (LNG) receiving terminal, in response to our EIA Study Brief issued in June 2005;

(c) On promoting renewable energy, HEC commissioned the first local commercial scale wind turbine in February 2006 on Lamma Island. CLP is also exploring suitable sites for setting up its first wind turbine power plant in Hong Kong; and

(d) On the overall retrofit programme, HEC has agreed to compress it by optimizing and accelerating the projects such that the environmental benefits can be fully realized by 2010. CLP is also considering compressing its project schedule.

7. For the long-term environmental regulation of the power sector, the Government has proposed in the Stage II "Consultation Paper on Future Development of the Electricity Market in Hong Kong" that the permitted rate of return on all fixed assets of the power companies be linked to their achievement of the emission caps stipulated in the SPLs. In addition, all capital expenditure for emission reduction facilities will be subject to the lowest rate of return. This approach retains the incentives for the power companies to invest in such facilities to help achieving the emission reduction targets, while lessening the financial burden on consumers.

8. Following the conclusion of the public consultation, the Economic Development and Labour Bureau informed the Legislative Council Panel on Economic Services on 29 May 2006 of the views received during the consultation. The Government will take into account these views and discuss with the power companies to finalize the post-2008 regulatory arrangements.

**Cooperation with the Mainland**

9. A close partnership with the Mainland authorities is crucial to achieving the 2010 emission reduction targets. The latest progress of the HKSARG and the Guangdong Provincial Government in implementing enhanced control measures under the PRD Regional Air Quality Management Plan (the Management Plan) is set out in **Annexes A and B** respectively.

10. Cross-boundary cooperation in environmental protection featured prominently in the Ninth Plenary Session of the Hong Kong/Guangdong Co-operation Joint Conference held in Guangzhou on 2 August 2006. The two sides reconfirmed their determination to achieve the agreed emission reduction targets by 2010 to improve regional air quality.

11. The Special Panel on PRD Air Quality Management and Monitoring under the Joint Conference has completed an implementation framework for the Emission Trading Pilot Scheme for Thermal Power Plants in the PRD Region. After consultation with the concerned parties, the implementation framework will be presented to prospective participating power plants this year, so that they can identify trading partners and draw up emissions trading agreements.

12. In addition, both sides will announce in October 2006 the first half-yearly report on the monitoring results of the PRD Regional Air Quality Monitoring Network. They will also start a mid-term review of the Management Plan before the end of this year to assess the effectiveness of various emission reduction measures as well as the emission trends in the region, and to formulate appropriate strategies and enhanced control measures with a view to achieving the 2010 emission reduction targets.

13. Each of the two governments will also implement measures respectively. Measures to be or being taken by the Guangdong Province include –

(a) Guangdong will not plan for construction of new coal-fired or oil-fired power plants in the PRD region;

(b) LNG is being introduced for power generation;

(c) Guangdong will proceed with the retrofitting of FGD systems at existing power plants. It will strive to complete the relevant major works for large-scale generation units by 2008;

(d) Guangzhou and Shenzhen will speed up the introduction of National III motor vehicle emission standards (on a par with Euro III standards);

(e) leaded petrol will continue to be banned; and

(f) a pilot project will be implemented at Shenzhen to install vapour recovery systems at oil depots and petrol-filling stations to further control emissions of VOC effectively.

14. Hong Kong will adopt the following measures –

(a) introducing Euro IV motor vehicle emission standards for newly registered vehicles in phases in 2006;

(b) requiring power companies to carry out measures to reduce emissions and to increase the use of natural gas for power generation; and

(c) continuing to impose caps on the total emissions of power companies and completing the drafting of a new regulation for controlling VOC emissions.

**Action Blue Sky**

15. We have launched the Action Blue Sky Campaign with the slogan of "Clean Air for a Cool Hong Kong!". As pointed out by the Chief Executive, the Government needs the whole community's participation to combat air pollution. Every small step taken by each individual to support the clean-air initiatives in our daily lives can help reduce air pollution.

16. The Action Blue Sky Campaign is organized by the Environmental Protection Department, comprising a series of publicity and educational activities, such as TV announcements, roving exhibitions in 18 districts, a public forum to be held by the Advisory Council on the Environment, the Student Environmental Protection Ambassadors Scheme, and a seminar to showcase best environmental practices in business and industrial operations, etc. Through these publicity and educational activities, we hope to gain the full support of the public and the business community, particularly businesses investing in the PRD, in achieving our common goal – "Clean Air for a Cool Hong Kong!".

**Environmental Protection Department**
**August 2006**

**Annex A**

# Pearl River Delta Regional Air Quality Management Plan
# Work Progress up to early 2006

## Enhanced Control Measures of the HKSARG

| Measures | Implementation Programme | Progress (Up to 31.5.2006) |
|---|---|---|
| Encourage the replacement of diesel light buses with cleaner fuel ones | Since 2002, the Government has offered incentives to public light bus owners to encourage replacement of diesel light buses with liquefied petroleum gas (LPG) or electric ones. | The incentive scheme was introduced in August 2002 and completed by 31 December 2005.<br><br>Up to end of May 2006, there were 2,409 public LPG light buses, 140 private LPG light buses and one electric light bus.<br><br>Between January 2006 and end May 2006, around 70% of the newly registered public light buses were LPG models. |
| Require the retrofitting of particulate removal devices on pre-Euro diesel vehicles | Since 2002, financial assistance has been provided for retrofitting pre-Euro heavy diesel vehicles with particulate removal devices. | Financial assistance was provided in phases from December 2002 to December 2005 to retrofit catalytic converters to pre-Euro heavy diesel vehicles. All together, about 36,500 eligible vehicles were installed.<br><br>Since April, pre-Euro heavy diesel vehicles (including franchised buses) are required to be installed with approved emission reduction devices except those required to operate their on-board equipment under long idling situations (including lorries with cranes mounted, concrete mixers, pressure tankers and gully emptiers). The HKSARG intends to extend the requirement to these remaining pre-Euro heavy diesel vehicles. |
| Enhance the vapour recovery systems in petrol filling stations | Legislation requiring the recovery of petrol vapour emitted during vehicle refueling at petrol filling stations was introduced in 2003/04. | The Regulation came into effect on 31 March 2005. |

| Measures | Implementation Programme | Progress (Up to 31.5.2006) |
|---|---|---|
| Tighten motor fuel standards | Motor fuel standards will be tightened to Euro IV by 2005 (motor diesel standard has already been tightened to Euro IV since 2002). | Euro IV motor fuel standards came into effect on 1 January 2005. |
| Tighten tailpipe emission standards | To adopt Euro IV standards for tailpipe emissions from 2006. | Euro IV standards already introduced on 1 January 2006 for light –duty vehicles, and will be introduced on 1 October for heavy-duty vehicles. |
| | To be in line with EU in adopting Euro V standards for tailpipe emissions. | (New item included in December 2005) To be in line with EU to adopt Euro V standards for tailpipe emissions. |
| Reduce VOC emissions from the printing process, paints and consumer products | Phase I : To introduce legislation in 2004 or 2005 to require labeling of VOC-containing products. | During the public consultation held in September 2004 and subsequent discussions with stakeholders, members of the trade generally agreed to advance Phase II and impose direct limits on the VOC content of VOC products at an earlier date. Law drafting work is underway and we aim to table the legislation to LegCo in 2006. All VOC-containing products under control will be subject to the statutory limits in phases with effect from 2007 onwards. |
| | Phase II: To introduce legislation in phases to reduce the use of products with high VOC contents and to impose emission standards for the printing process. | |

| Measures | Implementation Programme | Progress (Up to 31.5.2006) |
|---|---|---|
| Reduce emissions from power stations | Effective and flexible mechanisms (which may include emissions trading) will be set up to control the total emissions of SO2, NOx and RSP from power stations to achieve respective reduction targets by 2010. | The emissions reduction options set out in the financial plans of the two power companies were approved by the Government in June 2005. CLP Power Hong Kong Limited will provide desulphurization and de-NOx systems for four of its coal-fired generating units each of 677MW. Hong Kong Electric Co. Ltd. will provide low-NOx burners and desulphurization systems for two of its coal-fired generating units each of 350MW.<br><br>In order to achieve the 2010 emissions reduction targets, the Government will gradually tighten up the total emissions caps upon the issue of Specified Process Licenses (SPLs) under the Air Pollution Control Ordinance. The two power companies are expected to consider options, including the speeding up the emissions reduction projects and participation in emissions trading etc., to achieve these targets.<br><br>CLP have been increasing the use of ultra low sulphur coal and is seeking to increase natural gas supply through the development of liquefied natural gas facilities.<br><br>HEC will commission its first natural gas generation unit of 300MW around July 2006. It also commissioned the first commercial scale wind turbine of 800kW in Hong Kong in February 2006. |

| Measures | Implementation Programme | Progress (Up to 31.5.2006) |
|---|---|---|
| | Introduce caps on total emissions from power plants. | Emission caps have been included in the SPLs granted to CLP's Castle Peak Power Station and Black Point Power Station respectively on 1 August 2005 and 1 January 2006. Similar emission caps will be imposed on HEC in licensing their L9 and upon their main licence renewal. EPD will continue to impose emission caps on power plants upon licence renewals with a view to reducing emissions to the practical minimum and achieving the 2010 reduction targets. |

**Annex B**

## Pearl River Delta Regional Air Quality Management Plan
## Work Progress up to early 2006

## Enhanced Control Measures of the Guangdong Provincial Government

| Measures | Implementation Programme | Progress (Up to 31.5.2006) |
|---|---|---|
| Use cleaner energy | To reduce gradually the energy consumption per 10000 Yuan GDP. To establish by 2010 a diversified energy production and supply system that is safe, stable, economical, efficient and clean. | The 500KV grid for transmitting electricity from the western provinces was completed on schedule. The Guangdong Liquefied Natural Gas (LNG) Project is being constructed according to plan. The construction of a number of major electric power sources and clean energy programmes is being speeded up.<br><br>To reduce reliance on more polluting fuel like coal and oil, Guangdong is developing two new natural gas projects apart from the Guangdong LNG Project –<br><br>(a) CNOOC Zhuhai Natural Gas Pipeline Project, with a capacity of 1.19 million tonnes/year, utilizes natural gas from the South China Sea since February 2006; and<br>(b) Zhuhai LNG Receiving Station Project, with a capacity of 3 million tonnes/year for Phase I, is expected to be commissioned partially by 2010.<br><br>Zhongshan Hengmen Power Plant and Zhuhai Hongwan Power Plant have been converted to use natural gas as fuel since February 2006. |

| Measures | Implementation Programme | Progress (Up to 31.5.2006) |
|---|---|---|
| | To construct natural gas trunk pipeline and the associated works. To complete Phase I in 2005 that will have a capacity of 3 million tonnes/year. In 2009, to complete Phase II that will increase the total capacity to 6 million tonnes/year and finish construction of a number of natural gas power plants. | The capacity of Guangdong LNG Project Phase I has been expanded from 3 million tonnes/year to 3.7 million tonnes/year. The total capacity for Phase II will be expanded to 7 million tonnes/year. The first shipment of LNG of Phase I arrived Dapeng receiving station on 26 May. It is expected to start supply of gas from mid-2006. Four new natural gas power plants at Daya Bay in Huizhou, Qianwan in Shenzhen, Shenzhen East and Zhujiang in Guangzhou are under construction with a total generating capacity of 4,650 MW. The generation units will be commissioned in phases starting later this year. Residents in Shenzhen, Guangzhou, Dongguan and Foshan can also use natural gas supplied through pipeline network. |
| | To improve by 2005 the 500KV dual circuit annular core transmission grid to ensure transmission of electricity from western provinces. | The 5 AC and 3 DC main transmission channels from western provinces have been completed. |
| Control the sulphur content of fuel | To control the use of high sulphur fuel (sulphur content of coal and fuel oil should be below 0.8% in the acid rain control zone by 2005). | Being implemented.<br><br>By 2010, enterprises which have not installed desulphurization system would have their fuel sulphur content controlled at below 0.7% for coal and below 0.8% for fuel oil. Those not meeting the limits would need to use, sulphur fixing agents or sulphur removal agents. |

| Measures | Implementation Programme | Progress (Up to 31.5.2006) |
|---|---|---|
| Reduce emissions from coal-fired and oil-fired power stations | To phase out small-scale thermal power generating units. Power plants with a capacity above 300MW to account for over 70% of the total installed capacity in the region in 2005, which is 35% higher than that in 2000. | All small thermal power generating units with capacities equal or below 50MW to be phased out by end 2007. About 240 generating units with a total capacity of approximately 2,500 MW are involved. |
| | To install flue gas desulphurization systems at the power plants in Shajiao, Huangpu, Taishan and Zhuhai by 2005. | Flue gas desulphurization systems installed at Shajiao Power Plant A (Unit 5), Shajiao Power Plant C (Unit 3), Shenzhen Xibu Power Plant (Units 4 to 6), Guangzhou Hengyun Power Plant, Guangzhou Ruiming Power Plant, Guangzhou Power Plant, two boilers at Yuancun Thermal Power Plant, Guangzhou Papermaking self-use thermal plant, Taishan Power Plant (Units 1 and 2), Jiangmen Xinhui Shuangshui Power Plant and Guangzhou Huangpu Power Plant (Units 5 and 6). Flue gas desulphurization systems are being retrofitted to all other generation units. |
| | To require all oil-fired and coal-fired generation units of capacity above 125MW to be equipped with flue gas desulphurization systems by 2007. | |
| | (New item included in December 2005)<br>To require all coal-fired and oil-fired power plants to adopt low-NOx combustion technologies in case of alteration or expansion. | Power plants under alteration or expansion are already required to install desulphurization equipment and on-line continuous emissions monitoring system. Low-$NO_X$ combustion technologies will be implemented at all units. |

| Measures | Implementation Programme | Progress (Up to 31.5.2006) |
|---|---|---|
| Control emissions from industrial boilers and industrial processes | To phase out coal-fired boilers with a capacity of less than 2 tonnes/hour in the urban areas of cities. By 2005, to stop using such coal-fired boilers in build-up areas of key cities. To require all large and medium-size industrial boilers to install desulphurization systems or adopt clean combustion technologies to reduce emissions. | The operation of coal-fired boilers of less than 2 tonnes/hour has been largely phased out in the urban areas of cities in the region. |
| | To continue phasing out various production technologies and installations that have caused serious pollution by emitting sulphur dioxide, smoke and particulates. | Programmes to phase out high energy consuming and highly polluting cement plants and vertical kilns are being implemented. The relocation project of Guangzhou Cement Plant, completed by end 2005, was estimated to reduce particulate emissions in the Region by 3,000 tonnes/year. |
| | (New item included in December 2005)<br>To actively study the technologies for controlling emission of nitrogen oxides from stationary sources such as power plant boilers, industrial boilers and restaurant boiling water furnaces. | Preparatory work is being conducted. |
| Reduce the emission of VOC from paints | To replace by 2003 paints using VOCs with xylene as solvents. | Work completed. |

| Measures | Implementation Programme | Progress (Up to 31.5.2006) |
|---|---|---|
| Reduce tailpipe 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-Shenping Express Trunk Road. | Phase I of Shenzhen-Shenping Express was completed in 2005. The whole expressway is expected to be commissioned in 2006.<br>Rail system between Guangzhou and Zhuhai started construction in December 2005. The system, 144km in length with a maximum speed of 200km/hr, is expected to be completed by 2009. |

| Measures | Implementation Programme | Progress (Up to 31.5.2006) |
|---|---|---|
| | To develop green transport by implementing clean vehicle action programmes in major cities of the region. To encourage the use of clean fuels, develop electric vehicles and actively promote the use of advanced clean fuel motor vehicles. | <u>Shenzhen</u><br>• Formulated the "Medium to Long Term Planning for the Development of Clean Vehicles in Shenzhen". Drew up and implemented the 2003-2008 general work programme for the use of clean fuel in public transport vehicles. All in-use public buses will be replaced by National III vehicles by end 2006 in advance of the schedule.<br>• All public transport vehicles must use diesel with sulphur content of less than 500 ppm. Introduction of motor diesel supply with sulphur content of less than 500 ppm.<br>• Preparations for promoting installation of vapour recovery systems at petrol filling stations, petrol tanker trucks and storage tanks are being pursued. Work plan will be formulated for implementation in phases at selected locations from end 2006.<br><u>Guangzhou</u><br>• Motorcycles are prohibited from using certain road sections in the urban areas and will be banned in the urban districts from 1 January 2007.<br>• Introduction of motor diesel with sulphur content of less than 500ppm.<br>• Active promotion of LPG public transport and taxis. By end 2005, all modification and replacement programmes had been completed for state-owned public transport companies. By end 2006, all public buses and taxis are expected to use LPG. By February 2006, there were over 5,800 LPG public transport vehicles and more than 10,000 LPG taxis. |

| Measures | Implementation Programme | Progress (Up to 31.5.2006) |
|---|---|---|
| | To require all new motor vehicles to fully 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 to ensure that over 90% of motor vehicles in the cities within the region will meet tailpipe emission standards by 2005. | National II emission standards have already been adopted since 1 July 2005. Striving to adopt National III standards by end 2006.<br><br><u>Shenzhen</u><br>• All newly registered public transport vehicles are already required to comply with the National III emission standards.<br>• To establish reporting and joint investigation system for smoky vehicles. 30,000 roadside inspections would be carried out by end 2006.<br>• To implement motor vehicles inspection / maintenance system.<br>• Adopted a labeling system on the environmental categorization of motor vehicles.<br><br><u>Guangzhou</u><br>• To implement in-use vehicles emission standards and to introduce cycle test for motor vehicles in phases by 2007.<br>• To establish a database for motor vehicles emissions control management for strengthening controls on motor vehicle testing industry.<br>• To improve the measures on roadside inspection and random check of vehicles with excessive emissions.<br>• To establish labeling system on the environmental categorization of motor vehicles.<br>• To implement phase out programme for highly polluting motor vehicles. |

| Measures | Implementation Programme | Progress (Up to 31.5.2006) |
|---|---|---|
| | (New item included in December 2005)<br>To study the feasibility of advancing the implementation of the National IV emission standards for light-duty vehicles by 2010.<br>To study the feasibility of advancing the implementation of the National V emission standards for heavy-duty vehicles by 2010.<br>To strengthen management on regular inspections of in-use motor vehicles to make sure that the required environmental performance is met. | Preparatory work is being conducted. |