

For Information  
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**LEGISLATIVE COUNCIL  
PANEL ON ENVIRONMENTAL AFFAIRS  
SUBCOMMITTEE ON IMPROVING AIR QUALITY**

**Progress of Measures  
under Pearl River Delta Regional Air Quality Management Plan  
to Achieve 2010 Emission Reduction Targets**

**Purpose**

This paper reports on the latest progress of implementation of measures, including those under the Pearl River Delta (PRD) Regional Air Quality Management Plan (Management Plan), to improve air quality and meet the 2010 emission reduction targets.

**Background**

2. To improve regional air quality, the Hong Kong Special Administrative Region (SAR) Government reached a consensus with the Guangdong Provincial Government in April 2002 to reduce, on a best endeavour basis, the emissions of four major air pollutants, namely sulphur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), 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 significantly help to improve the air quality of the PRD Region and relieve the regional smog problem.

3. Since September 2005, we have been providing six-monthly reports to the Panel on Environmental Affairs (EA Panel) on the progress of meeting the 2010 emission reduction targets. We last reported to the EA Panel in July 2008. This is the seventh progress report.

**Progress of Emission Reduction**

4. We are making good progress in the implementation of local emission reduction measures. Except for SO<sub>2</sub> whose emission level has increased by 3% (down from the height of 45% above the 1997 figure in 2004, and 12% above the 1997 figure in 2006) due to a rise in the use of coal in power generation in recent years, the emission levels of all other pollutants have dropped when compared with those in 1997. Details are as follows –

	<b>Emission Level in 1997 (Tonnes)</b>	<b>Change in Emission Level during 1997-2007</b>	<b>Emission Reduction Target for 2010</b>
SO <sub>2</sub>	66 200	+3%	-40%
NO <sub>x</sub>	124 000	-21%	-20%
RSP	11 500	-51%	-55%
VOC	68 800	-42%	-55%

5. As the two local power companies are retrofitting their coal-fired power generation units with flue gas desulphurization (FGD) facilities in stages, we expect the SO<sub>2</sub> emissions from the power sector to continue to drop in the run up to 2010.

## **Latest Measures to Control Emissions from Major Sources**

### ***Transport sector***

6. To further step up the local efforts in controlling emissions from the transport sector, we are rolling out the following initiatives –

- (a) after careful consideration of the views of the stakeholders, we have fine tuned the arrangements for taking forward the proposed statutory ban on idling vehicles with running engines. We will consult the EA Panel on the revised proposal, which aims to strike a reasonable balance among environmental considerations, operational needs of the transport trades and enforcement effectiveness, on 15 January 2009. Our target is to introduce a bill into LegCo in 2009;
- (b) we are developing a proposal to strengthen the control of emissions from petrol and liquefied petroleum gas vehicles, including the use of roadside remote sensing equipment and dynamometers for emission testing. Our plan is to consult the stakeholders in 2009;
- (c) we are making preparation to stipulate the specification for pure motor vehicle biodiesel and the requirements for motor vehicle biodiesel blended with diesel in the Air Pollution Control (Motor Vehicle Fuel) Regulation (Chapter 311L). This will help to ensure fuel quality, boost users' confidence and secure a better control on the impact of biodiesel on the environment, thereby promoting the development of the biodiesel market. We are conducting a consultation for preparing the enabling legislation for implementation in 2009;

- (d) we are making preparation to further tighten the statutory standards of motor vehicle diesel and unleaded petrol to the Euro V standards;
- (e) we will study to control the emissions of off-road mobile sources operating within the airport and container terminals. We plan to consult the relevant trades in 2009; and
- (f) we have set up an inter-departmental working group to conduct a trial on ferries using ultra low sulphur diesel (ULSD). We plan to commence the trial in 2009. Subject to its findings, we would draw up a scheme to encourage ferry operators to switch to using ULSD.

7. In addition to the above, we have been implementing the following incentive schemes to promote a wider use of more environment-friendly vehicles –

- (a) on the \$3.2 billion one-off grant scheme to encourage car owners to replace their pre-Euro and Euro I diesel commercial vehicles with the Euro IV models, we have extended the deadline for owners of pre-Euro diesel commercial vehicles to apply for the grant from 30 September 2008 to 31 March 2010 (which is the same as that for the Euro I models). As at the end of December 2008, we have received 10 760 applications and approved 10 636 of them. Since the introduction of the scheme, the number of pre-Euro and Euro I diesel commercial vehicles have been reduced from about 58 500 to 43 000 as at end 2008;
- (b) we have provided a 30% reduction in First Registration Tax (FRT), subject to a cap of \$50,000 per vehicle, to encourage the use of more environment-friendly private vehicles. As at the end of December 2008, we have received 6 786 applications and approved 6 763 of them; and
- (c) since 1 April 2008, we have reduced the FRT of environment-friendly commercial vehicles to encourage early take-up of these vehicles, which are currently pitched at the Euro V standards. As at the end of December 2008, we have received and approved 196 applications.

### ***Power Sector***

8. Power generation is the main source of emissions in Hong Kong. To deliver the 2010 emission reduction targets, we have imposed emission caps on all power plants and are progressively tightening them during licence renewals. We further brought the Air Pollution Control (Amendment) Ordinance 2008 through LegCo in July 2008 to give statutory effects to the emission caps for power plants in 2010 and beyond. The amendments also provide for the local power plants to engage in

emission trading amongst themselves or with their counterparts in the PRD Region as a means to meet the emission caps.

9. To encourage Hongkong Electric (HEC) and China Light & Power (CLP) to take more proactive steps to reduce emissions and sustain strict compliance with the environmental requirements, we have set out a number of incentives and penalty arrangements in the new Scheme of Control Agreements signed with them on 7 January 2008. These arrangements include –

- (a) linking the permitted rate of return of the two power companies to their environmental performances. A higher rate of return will be provided for rewarding better than required performance in reducing emissions and improving air quality. Likewise, the new arrangements provide for financial disincentives in terms of a lower rate of return for emitting more pollutants than permissible; and
- (b) providing a higher rate of return to the power companies for their investment in renewable energy facilities and offering them a bonus in permitted return depending on the extent of renewable energy usage in their electricity generation.

10. Other major progress in reducing emissions from the power sector include the following –

- (a) on 28 August 2008, the Hong Kong SAR Government signed a Memorandum of Understanding (MoU) with the National Energy Administration to ensure a stable and long-term supply of nuclear electricity and natural gas from three different sources, namely offshore gas, piped gas and liquefied natural gas. At present, 28% of electricity generated by power plants in Hong Kong is gas-fired. To improve air quality and address the challenges posed by global warming, we will actively explore ways to gradually increase the use of clean energy by, for example, increasing the proportion of natural gas for local electricity generation to 50%. As part of our review of AQOs, we will consult the public on this as well as other measures to improve air quality;
- (b) on promotion of renewable energy, both HEC and CLP are conducting Environmental Impact Assessment studies for developing commercial scale off-shore wind farms in Hong Kong waters; and
- (c) both HEC and CLP are making good progress in retrofitting their power generation units with FGD facilities. The retrofit projects are expected to complete in phases between 2009 and 2011.

## ***Other Sources***

11. At the same time, we have been implementing the following major initiatives progressively to control emissions from other sources –

- (a) we introduced the Air Pollution Control (Fuel Restriction) (Amendment) Regulation, which came into effect on 1 October 2008, to mandate the use of ULSD in industrial and commercial processes. This will reduce about 2 480 tonnes of SO<sub>2</sub> emission per year, or about 3.7% of the total local SO<sub>2</sub> emission in 2007<sup>1</sup>; and
- (b) we are formulating a proposal to extend the control of the Air Pollution Control (Volatile Organic Compounds) Regulation (Chapter 311W) to other products with high VOC contents, including adhesives, sealants, vehicle refinishing paints, marine vessel paints and pleasure craft paints, to limit their VOC contents in phases from January 2010.

## ***Review of Air Quality Objectives***

12. We also commissioned a comprehensive consultancy study in June 2007 to review Hong Kong's Air Quality Objectives (AQOs) and develop a long-term air quality management strategy, taking into account the latest international developments, including the Air Quality Guidelines recently published by the World Health Organization. We will engage the public in the course of the study, which is expected to complete in 2009.

## ***Promotion of Energy Efficiency***

13. Apart from controlling emissions at source, another effective way of reducing emissions is through enhancing energy efficiency and promoting energy conservation. In this regard –

- (a) we are preparing a legislative proposal for mandatory implementation of the Building Energy Codes to improve energy efficiency in new and existing buildings. We aim to introduce the legislation into LegCo in 2009;
- (b) we introduced a mandatory Energy Efficiency Labelling Scheme through the Energy Efficiency (Labelling of Products) Ordinance (Chapter 598), which came into effect on 9 May 2008, to encourage the use of energy-efficient products. The initial phase of this scheme

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<sup>1</sup> Based on an annual consumption of about 378 million litres of industrial diesel in Hong Kong.

covers three types of products, namely, room air conditioners, refrigerating appliances and compact fluorescent lamps. We will propose amendments to this ordinance in 2009 to cover more products under the second phase of the scheme;

- (c) we will reserve \$150 million and \$300 million under the Environment and Conservation Fund to subsidize qualified building owners in carrying out energy-cum-carbon audits and energy efficiency projects respectively;
- (d) we will promote environmental protection and energy conservation in government buildings, including setting targets in various environmental aspects for new government buildings. We will also promote the use of energy efficient designs and technologies by means of demonstration projects;
- (e) we plan to develop a district cooling system at the Kai Tak Development to supply chilled water to buildings in the region for centralised air-conditioning;
- (f) we will conduct a study on phasing out incandescent light bulbs and replacing them with more energy efficient lighting products. The study will look into the case for introducing a statutory restriction on the sale of incandescent light bulbs; and
- (g) we will conduct a consultancy study on energy wastage arising from the excessive use of external lighting and assess the feasibility of regulating external lighting by legislation.

### **Co-operation with Guangdong Province and Mainland**

14. To achieve the 2010 emission reduction targets, the Guangdong Provincial Government is also working in earnest to implement the control measures under the Management Plan. The emission reduction measures on the Mainland side focus on power plants, vehicles and the more polluting industrial processes. These cover the following –

- (a) establishing a diversified clean energy production and supply system, including development of gas-fired power plants and transmission of electricity from the western provinces;
- (b) requiring all large-scale thermal power generating units to carry out FGD;

- (c) requiring thermal power plants to install continuous emissions monitoring systems (CEMS) with instant on-line access by local authorities;
- (d) requiring all thermal power plants that are under construction, alteration or expansion to carry out flue gas denitrification;
- (e) closing down small thermal power plants and other serious polluting industries (including cement plants and iron and steel plants with low production capacity);
- (f) stepping up annual inspections and on-road spot checks on vehicles;
- (g) restricting the growth of motorcycles at key cities and banning them in the Guangzhou and Dongguan city areas;
- (h) implementing an environment labeling pilot system for vehicles at key cities, so that vehicles of specific categories are restricted from using the roads when the ambient air quality is bad;
- (i) constructing metro expressway systems, developing green transportation and strengthening tailpipe emission standards; and
- (j) enhancing technological improvement at enterprises and promoting cleaner production (for example, requiring new projects to meet advanced cleaner production standards).

15. Since our last progress report in July 2008, the Guangdong Provincial Government has embarked on the following additional emission reduction measures –

- (a) requiring newly registered motor vehicles in Guangdong to comply with the National III standards (which are on a par with the Euro III standards);
- (b) supplying National III standard motor fuels at Dongguan, Zhuhai and Zhongshan in addition to Shenzhen and Guangzhou; and
- (c) implementing comprehensive vapour recovery system at petrol filling stations, oil depots and tanker trucks at major PRD cities.

16. After considering the recommendations made in the Mid-term Review Report, the Guangdong Provincial Government has taken on board additional control measures in the Management Plan. It will take actions to promote the earlier supply of National IV standard motor fuels and establish a provincial information management network on motor vehicle inspection.

17. We are also working on the following joint initiatives with the Mainland authorities to improve regional air quality –

- (a) in April 2008, we launched a five-year Cleaner Production Partnership Programme in conjunction with the Economic and Trade Commission of Guangdong Province to encourage and facilitate Hong Kong-owned factories operating in the PRD Region to adopt cleaner production technologies and practices, with a view to reducing emissions and enhancing energy efficiency. Together with the local authorities of Shenzhen, Dongguan, Foshan, Jiangmen, Huizhou, Zhongshan etc, we have organized seminars and workshops in the PRD Region to promote the programme. On 13 November 2008, we signed a “Co-operation Agreement on Cleaner Production between Hong Kong and Shenzhen” with the Shenzhen Municipal Environmental Protection Bureau to enhance joint effort of both governments in promoting cleaner production amongst factories in Shenzhen;
- (b) at the 11<sup>th</sup> Plenary of the Hong Kong/Guangdong Co-operation Joint Conference held on 5 August 2008, we reached a consensus with the Guangdong Provincial Government to jointly transform the PRD Region into a green and quality living area under the principle of promoting environmental protection and sustainable development. Our common goal is to enhance the appeal and competitiveness of the whole region. Building on the basis of cooperation in improving the regional air quality, both sides will seek to develop a more all-rounded strategy to address the environmental issues facing the region. Mapping out the post-2010 arrangements for tackling regional air pollution will be one of the key areas of co-operation. Both sides will work together to draw up detailed co-operation arrangements; and
- (c) on 29 October 2008, both sides jointly released a report on the monitoring results of the PRD Regional Air Quality Monitoring Network for the first half of 2008. We aim to complete the report covering the whole year of 2008 in April 2009.

18. Details of the latest progress of the Hong Kong SAR Government and the Guangdong Provincial Government in implementing the emission reduction measures under the Management Plan are set out at **Annexes A to E**. Both sides are committed to meeting the 2010 emission reduction targets and will continue to keep track of the progress.



**Pearl River Delta Regional Air Quality Management Plan  
Enhanced Control Measures of  
Hong Kong Special Administrative Region**

<b>Measures</b>	<b>Implementation Programme</b>	<b>Progress</b>
Encourage replacement of diesel light buses with ones using clean fuel (already commenced)	Since 2002, the Government has offered incentives to diesel light bus owners to encourage replacement of diesel light buses with liquefied petroleum gas (LPG) or electric ones.	<p>The incentive scheme was introduced in August 2002 and completed by 31 December 2005.</p> <p>As at the end of November 2008, there were 2 607 public LPG light buses, accounting for 60% of the entire public light bus fleet.</p>
Require retrofitting of particulate removal devices on pre-Euro diesel vehicles	With effect from 1 April 2007, pre-Euro diesel vehicles have to be installed with approved particulate removal devices.	<p>Financial assistance was provided in phases from December 2002 to December 2005 to retrofit pre-Euro heavy-duty diesel vehicles with catalytic converters. All together, about 36 500 eligible vehicles were installed with catalytic converters.</p> <p>Since April 2006, all pre-Euro heavy-duty diesel vehicles (including franchised buses), except those operate under long idling situations (including lorries with cranes mounted, concrete mixers, pressure tankers and gully emptiers), were required to be installed with approved emission reduction devices. This requirement was extended to the “long-idling” vehicles since April 2007.</p>
Encourage vehicle owners to replace pre-Euro and Euro I commercial diesel vehicles with Euro IV models	Since 1 April 2007, the Government has offered a time-limited one-off grant to vehicle owners to encourage the early replacement of pre-Euro and Euro I diesel commercial vehicles with new ones which comply with the statutory emission standards for newly registered vehicles (which is now the Euro IV emission standards).	A total of 10 636 applications have been approved (as at the end of December 2008).

<b>Measures</b>	<b>Implementation Programme</b>	<b>Progress</b>
Encourage members of public to use environmentally friendly private petrol vehicles	With effect from 1 April 2007, a 30% reduction in the First Registration Tax (FRT) was offered to the purchasers of environment-friendly private petrol vehicles, subject to a cap of \$50,000 per vehicle.	A total of 6 763 environment-friendly private petrol vehicles were covered under the scheme (as at the end of December 2008).
Encourage use of environment-friendly commercial vehicles	(New item included in 2008) With effect from 1 April 2008, a reduction in FRT would be offered to the purchase of environment-friendly commercial vehicles.	A total of 196 environment-friendly commercial vehicles were approved under the scheme (as at the end of December 2008).
Require drivers to switch off idling vehicles with running engines	To require drivers to switch off idling vehicles with running engines.	After considering the outcome of the public consultation, the Government will put together a revised proposal to introduce a statutory ban on idling vehicles with running engines. We will consult the Panel on Environmental Affairs in January 2009.
Strengthen control of emissions from petrol and LPG vehicles	To consult stakeholders on proposals to strengthen the control of emissions, including the use of roadside remote sensing device and chassis dynamometer for emission testing.	The Government will commence the consultation in 2009.
Tighten emission standard for in-use diesel vehicles	(New item included in 2008) To study the further tightening of dark smoke emission standard for in-use diesel vehicles.	A proposal will be prepared for consultation with the transport trades in 2009.
Enhance vapour recovery systems in petrol filling stations (Item completed)	The Air Pollution Control (Petrol Filling Stations) (Vapour Recovery) Regulation was amended in 2004 to require the recovery of petrol vapour emitted during vehicle refuelling at petrol filling stations, with effect from 31 March 2005.	Since 31 March 2005, all newly built petrol filling stations have to be installed with vapour recovery systems. Since 31 March 2008, all petrol filling stations have been retrofitted with such systems to recover petrol vapour emitted during refuelling.

<b>Measures</b>	<b>Implementation Programme</b>	<b>Progress</b>
Tighten motor fuel standard	The motor fuel standard were tightened to the Euro IV standard by 2005 (the motor diesel standard has already been tightened to the Euro IV standard since 2002).	The Euro IV petrol standard came into effect on 1 January 2005.
	To introduce the supply of motor vehicle fuels meeting the Euro V standard.	With effect from 14 July 2008, the duty rate for Euro V motor vehicle diesel has been waived to encourage the early supply of more environment-friendly fuels on the local market.
	(New item included in 2008) To develop specifications and regulations on the use of biodiesel as vehicle fuel in Hong Kong.	The Government is now consulting the trades on the draft biodiesel specifications and regulatory framework for preparing the enabling legislation for implementation in 2009.
Tighten emission standard for newly registered vehicles	The Euro IV emission standard was adopted since 2006.	The Euro IV emission standard was introduced on 1 January 2007 for all newly registered vehicles.
	To follow the European Union in adopting the Euro V motor vehicles standard for tailpipe emissions.	We are consulting vehicle suppliers about the availability of Euro V compliant models for Hong Kong market.
Use of cleaner fuels by ferries	To look into the use of cleaner fuels by local ferries.	The Government set up an inter-departmental working group in December 2007 to develop a trial scheme on the use of ultra low sulphur diesel (“ULSD”) (sulphur content not more than 0.005%) by local ferries. The scheme is expected to commence in 2009. Subject to the trial result, the Government would draw up options to encourage local ferry operators to switch from using high sulphur diesel (sulphur content not more than 0.5%) to ULSD. The move will reduce sulphur dioxide and suspended particulates emissions from each vessel by about 99% and 10% respectively.

<b>Measures</b>	<b>Implementation Programme</b>	<b>Progress</b>
Control emissions from off-road mobile sources operating within airport and ports	(New item included in 2008) To draw up measures to control emissions from off-road mobile sources operating within the airport and ports (including mobile machinery and vehicles). Measures will include the statutory emission standards for mobile machinery.	We plan to consult the relevant trades in 2009.
Reduce volatile organic compounds (VOC) emissions from printing process, paints and consumer products	To introduce legislation in 2004 or 2005 to require the labeling of VOC content on VOC products.  Legislation will then be introduced in phases to reduce the use of products with high VOC contents and to impose emission standards for the printing process.	Since 1 April 2007, the Government has enforced the new Regulation in phases to restrict the VOC content of architectural paints/coatings, printing inks and six major types of selected consumer products (i.e. air fresheners, hairsprays, multi-purpose lubricants, floor wax strippers, insecticides and insect repellents). Lithographic heatset printing machines are also required to be installed with emission control devices from 1 January 2009.  We plan to amend the Air Pollution Control (Volatile Organic Compounds) Regulation in mid-2009 to extend the control to cover vehicle refinishing paints, marine vessel paints/coatings, adhesives and sealants.
Reduce emissions from power stations	Effective and flexible mechanisms will be set up to control the total emissions of SO <sub>2</sub> , nitrogen oxides (NO <sub>x</sub> ) and respirable suspended particulates from power stations to achieve respective reduction targets by 2010.	The Government approved the emission reduction options set out in the financial plans of the two power companies in June 2005. CLP will provide desulphurization and denitrification systems for four of its coal-fired generating units each of 677MW. HEC will provide low-NO <sub>x</sub> burners and desulphurization systems for two of its coal-fired generating units each of 350MW and a desulphurization system for a coal-fired generating unit of 250MW.  CLP has been increasing the use of ultra low sulphur coal. HEC had commissioned its first natural gas generation unit of 335MW in October 2006. The first commercial scale wind turbine power generation unit of 800kW was also commissioned in Hong Kong in February 2006.

<b>Measures</b>	<b>Implementation Programme</b>	<b>Progress</b>
	To control total emissions from power plants and allow emission trading.	<p>Emission caps have been included in the Special Process Licences granted to CLP's Castle Peak Power Station, Black Point Power Station and Penny's Bay Power Station as well as HEC's Lamma Power Station. The caps will gradually be tightened with a view to reducing emissions for achieving the 2010 reduction targets.</p> <p>The Air Pollution Control (Amendment) Ordinance 2008 was enacted in July 2008. The emission caps for the power plants in Hong Kong in 2010 and beyond will be specified in the Technical Memorandum, which has come into effect in December 2008. Power plants are also allowed to conduct emission trading as an alternative means for compliance with the emission caps.</p>
	(New item included in 2008) To promote the wider use of clean fuels.	In August 2008, the Government reached a consensus with the National Energy Administration and the National Development and Reform Commission on the continuous supply of nuclear electricity and natural gas to Hong Kong in the coming two decades. A Memorandum of Understanding was signed. It was agreed in principle that the feasibility of supplying natural gas to Hong Kong via the planned Second West-East Natural Gas Pipeline would be studied, and that the Central People's Government would jointly build with Hong Kong a natural gas terminal on the Mainland for supplying natural gas to Hong Kong, with a view to promoting wider use of clean fuels and reducing emissions from power plants.
Reduce emissions from industrial and commercial processes	To mandate the use of ULSD in industrial and commercial processes.	The Government completed the legislative process of the Air Pollution Control (Fuel Restriction) (Amendment) Regulation, which came into effect on 1 October 2008.
Enhance energy efficiency of buildings	To consult the public on the proposal to introduce mandatory implementation of the Building Energy Codes (BEC).	Public consultation on the proposal of mandatory implementation of BECs was completed on 31 March 2008. The Government is preparing the necessary legislative proposal by taking into account

Measures	Implementation Programme	Progress
		comments received during the public consultation.
Mandatory Energy Efficiency Labelling Scheme	To launch the Mandatory Energy Efficiency Labelling Scheme.	The Legislative Council passed the Energy Efficiency (Labelling of Products) Ordinance. The first phase of the Mandatory Energy Efficiency Labelling Scheme will be implemented in November 2009. The Government will make preparation for the amendments to the Energy Efficiency (Labelling of Products) Ordinance for the second phase of the scheme to cover additional appliances.
Encourage to adopt cleaner production technologies and processes	A five-year programme to be launched to give professional and technical support to Hong Kong-owned factories in the PRD Region to adopt cleaner production technologies and practices.	The Government launched the “Cleaner Production Partnership Programme” in April 2008 to engage Hong Kong-owned factories in the PRD Region to adopt cleaner production technologies and practices in the coming five years.

**Environment Bureau**  
**January 2009**

**Pearl River Delta Regional Air Quality Management Plan  
Enhanced Control Measures of Guangdong Provincial Government**

Measures	Implementation Programme	Progress (Up to 30 November 2008)
Use cleaner energy	To reduce gradually the energy consumption per 10,000 Yuan GDP. To establish by 2010 a diversified energy production and supply system that is safe, stable, economical, efficient and clean.	<p>The energy consumption per 10,000 Yuan GDP of Guangdong for 2007 was 0.747 tons of standard coal equivalent, down 3.15% as compared with that in 2005. The energy consumption per 10,000 Yuan GDP is expected to decrease by 16% in 2010 (as compared with 2005 level).</p> <p>To reduce reliance on more polluting fuel like coal and oil, Guangdong is developing two new natural gas projects apart from the Guangdong Liquefied Natural Gas (LNG) Project –</p> <ul style="list-style-type: none"> <li>(a) CNOOC Zhuhai Natural Gas Pipeline Project, with a capacity of about 1.19 million tonnes/year, utilizes natural gas from the South China Sea since February 2006; and</li> <li>(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.</li> </ul> <p>The power plants that have been converted to the use of natural gas as fuel include Zhongshan Hengmen Power Plant, Zhuhai Hongwan Power Plant (since February 2006) and Shenzhen Nanshan Power Plant (since April 2007).</p>
	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.	<p>The capacity of Guangdong LNG Project Phase I has been expanded from 3 million tonnes/year to 3.7 million tonnes/year and gas supply was started in mid 2006. The total capacity for Phase II will be expanded to 7 million tonnes per year.</p> <p>Four newly built natural gas power plants (with a total of 11 generating units) have all been commissioned in 2006 and 2007. Residents in Shenzhen, Guangzhou, Dongguan and Foshan can also use natural gas supplied through pipeline network.</p>

Measures	Implementation Programme	Progress (Up to 30 November 2008)
	To improve by 2005 the 500KV dual circuit annular core transmission grid to ensure transmission of electricity from western provinces.	The five AC and three DC main transmission channels from western provinces have been completed.
	To rationalize the distribution of new power stations. Apart from proper construction of generating units for combined heat and power supply and those thermal power plant projects which have been reported to the State for planning and building, no more new coal-fired and oil-fired power plants will be planned for building in the PRD Region.	Being implemented.
	To gradually enlarge the scale of electricity transmission from western provinces to Guangdong.	Being implemented.
Control 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.  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.
Reduce emissions from coal-fired and oil-fired power stations	To phase out small-scale thermal power generating units. Power plants with a capacity equal or above 300 MW to account for over 70% of the total installed capacity in the region in 2005, which is 35% higher than that in 2000.	The Guangdong Provincial Government announced its plan in March 2007 to close down small thermal power generating units with a total capacity of 9 660 MW in the Province by the end of 2010, including those with a total capacity of about 7 100 MW in the PRD Economic Zone. [Units of about 1 600 MW to be closed down in 2007, 3 600 MW in 2008 and 1 900 MW in 2009 ( <b>Annex C</b> ).]



<b>Measures</b>	<b>Implementation Programme</b>	<b>Progress (Up to 30 November 2008)</b>
	To install FGD systems at the power plants in Shajiao, Huangpu, Taishan and Zhuhai by 2005.	FGD systems have already been installed (including works pending official check and acceptance) for generating units with a capacity of around 25 200 MW, thereby reducing the annual SO <sub>2</sub> emission by more than 750 000 tonnes. In addition, generating units of around 915 MW are being retrofitted with this system. Upon completion of the latter in end 2008, large scale thermal power generating units in Guangdong will all be equipped with FGD.
	To require all oil-fired and coal-fired generating units of capacity above 125MW to be equipped with FGD systems by 2007.	
	To require all coal-fired and oil-fired power plants to adopt low nitrogen oxides (low-NO <sub>x</sub> ) combustion technologies in case of alteration or expansion.	Low-NO <sub>x</sub> combustion technologies have already been required at all units in case of alteration or expansion.
	To require all coal-fired and oil-fired power plants under construction, alteration or expansion to install flue gas denitrification systems.	Being implemented.
	To promote the installation of low-NO <sub>x</sub> combustion device at existing coal-fired and oil-fired power plants.	Being implemented.  Guangzhou Ruiming Power Plant and Hengyun Power Plant D had installed de-denitrification systems. Tenders are being invited for installation of denitrification systems at Guangzhou Zhujiang Power Plant (Unit 4) and Shenzhen Mawan Power Plant (Unit 1).
	To study the feasibility of installing flue gas denitrification systems for existing power plants.	Development and Reform Commission of Guangdong Province has issued the relevant policy document and notification on the need for existing power plants to install denitrification systems.
	To require all power plants under construction, alteration or expansion to install FGD equipment, particulate removal devices and automatic continuous emissions monitoring system.	Being implemented. Power plants are required to put in place continuous emission monitoring system (CEMS) by end 2008, with a view to allowing the relevant authorities to have instant on-line access to the CEMS data.

<b>Measures</b>	<b>Implementation Programme</b>	<b>Progress (Up to 30 November 2008)</b>
	To enhance technological improvements of existing power plants and to implement cleaner production. Newly built power plants have to meet the advanced standard on cleaner production in the country.	Being implemented.
	To materialize the subsidization policy for thermal power plants to desulphurize by giving concessions, support and assistance in land acquisition for desulphurization systems and import of essential equipment so as to facilitate the full implementation of desulphurization projects.	From 1 July 2006, power plants with desulphurization system receive an extra RMB 1.5 cents per unit when the electricity is sold to the power grid.
	To establish a province-wide quota administration system for total emissions of SO <sub>2</sub> and to study the emissions trading mechanism of SO <sub>2</sub> .	Being implemented.
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.	<p>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. Removal devices for particulates must be installed onto all industrial boilers. Restaurants located in sensitive areas and restaurants the operation of which would seriously affect public production must be installed with devices to purify cooking fumes.</p> <p><u>Guangzhou</u> As at the end of November 2008, 8 532 catering businesses had switched to clean energy uses; 4 371 had installed fumes abatement facilities. The use of clean energy by large catering businesses in the developed urban area had reached 94.13%.</p>

<b>Measures</b>	<b>Implementation Programme</b>	<b>Progress (Up to 30 November 2008)</b>
	<p>(New item included in 2008) To tighten emissions standards for local boilers by 2010, so as to reduce emissions from industrial boilers and other boilers (e.g. commercial boilers).</p>	<p>Being prepared.</p>
	<p>To continue phasing out various production technologies and installations that have caused serious pollution by emitting SO<sub>2</sub>, smoke and particulates.</p>	<p>To implement on a mandatory basis a system to phase out enterprises, various production technologies and installations that have caused serious pollution.</p> <p>In principle, no construction of new cement plants and extension of cement plants will be planned in the PRD Region. Future development will focus on projects of new dry-type cement plant with daily production capacity of more than 4 000 tonnes. Projects of new dry-type rotary kiln cement plant with daily capacity of 2 500 tonnes and below will be prohibited.</p> <p>Programmes are being implemented to phase out high energy consuming and highly polluting cement plants, production lines of vertical kilns, dry hollow kilns, Lepol kilns and wet process kilns.</p> <p>The relocation project of Guangzhou Cement Plant, completed by end 2005, was estimated to reduce particulate emissions in the Region by approximately 3 000 tonnes/year.</p> <p>Some cement production units located in Sanshui area in Foshan City were closed down by the end of 2007. All existing vertical kiln cement production units will be closed down by the end of 2008.</p> <p>Guangdong had phased out cement plants with a total production volume of 24.7 million tonnes by end 2007. Guangzhou, Foshan, Dongguan, Shenzhen, Zhongshan and Zhuhai will close down all serious polluting cement plants by end 2008. Guangdong announced in January 2008 a plan to phase out all serious polluting cement plants in the province (a total</p>

Measures	Implementation Programme	Progress (Up to 30 November 2008)
		<p>production volume of 38 million tonnes) during the 11<sup>th</sup> five-year Plan period, amongst which, a total production volume of 28.53 million tonnes is located within the PRD Economic Zone (<b>Annex D</b>).</p> <p>Guangdong announced in October 2007 a plan to phase out iron and steel plants (a total production volume of 16 million tonnes) (<b>Annex E</b>) by end 2010</p>
	<p>To actively study the technologies for controlling emission of NO<sub>x</sub> from stationary sources such as power plant boilers, industrial boilers and restaurant boiling water furnaces.</p>	<p>Emission of NO<sub>x</sub> from stationary sources such as electricity station boilers, industrial boilers and restaurant boiling water furnaces will be under control in 2010.</p>
	<p>Location and planning of industries causing serious pollution will be strictly determined and administered centrally. The system of environmental assessment of construction projects will be enhanced.</p>	<p>Being implemented.</p>
	<p>For industrial sectors such as petrochemicals, steel, non-metallic mineral products, paper and paper products, textile and dyeing, technological improvement at existing enterprises will be enhanced and cleaner production will be implemented. New projects have to meet the advanced standard on cleaner production in the country.</p>	<p>Being implemented.</p>
	<p>Initiate tasks for vapour recovery at petrol filling stations, tanker trucks and oil depots. To fully implement motor fuel vapour emission standard for all oil depots, tanker</p>	<p>Guangdong announced in March 2008 a plan to complete vapour recovery work at oil depots, tanker trucks and petrol filling stations in the major PRD cities by end 2010.</p>

<b>Measures</b>	<b>Implementation Programme</b>	<b>Progress (Up to 30 November 2008)</b>
	trucks and petrol filling stations.	
Reduce emission of volatile organic compounds (VOC)	To replace by 2003 paints using VOCs with xylene as the main solvent.	Completed. Since 1 January 2006, all water-based paints and adhesives are required to comply with the technical requirement of environmentally friendly products. All water-based paints and adhesives bearing an environmentally friendly label have to comply with the VOC content limit.
	(New item included in 2008) To strengthen implementation of cleaner production standards for printing and paint industries, within the PRD Economic Zone to reduce VOC emission.	Being implemented.
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 has been commissioned. Rail system between Guangzhou and Zhuhai started construction in December 2005. The system, 144 km in length with a maximum speed of 200 km/hr, is expected to be completed by 2009.

<b>Measures</b>	<b>Implementation Programme</b>	<b>Progress (Up to 30 November 2008)</b>
	<p>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, actively promote the use of advanced clean fuel motor vehicles and step up the development of public transport.</p>	<p><u>Shenzhen</u></p> <p>(a) Formulated the “Medium to Long Term Planning for the Development of Clean Vehicles in Shenzhen”.</p> <p>(b) Drew up and implemented the 2003-2008 general work programme for the use of clean fuel in public transport vehicles.</p> <p>(c) The National III emission standard has been implemented ahead of schedule for newly purchased public transport vehicles as well as replacements. In 2007, the number of replacements amounted to 1 874, making a total of 8 702 public transport vehicles complying with the National III emission standard in the city.</p> <p>(d) A total of 50 new generation hybrid public transport vehicles are planned to run in Shenzhen by the end of 2008.</p> <p><u>Guangzhou</u></p> <p>(a) Active promotion of LPG public transport vehicles. There are over 6 700 LPG-driven public buses in Guangzhou, accounting for 80% of all public buses in the city (as at the end of 2007). The 16 700 taxis in the city have largely been converted into LPG taxis. At present, there are 28 LPG refilling stations.</p> <p>(b) New generation hybrid public transport vehicles started to run in Guangzhou in January 2008.</p> <p><u>Huizhou</u></p> <p>From 1 August 2007, all newly added public transport vehicles are required to comply with the National III emission standard.</p>

<b>Measures</b>	<b>Implementation Programme</b>	<b>Progress (Up to 30 November 2008)</b>
	<p>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 standard by 2005.</p>	<p>The National II emission standard has been adopted since 1 July 2005.</p> <p>A recommended catalogue of motor vehicles complying with the National III emission standard has been introduced on 1 July 2006 to encourage and support the sale, import, purchase and use of motor vehicles on the catalogue.</p> <p>Starting from 1 July 2008, all newly registered motor vehicles in Guangdong Province have to comply with National III emission standard.</p> <p><u>Guangzhou</u></p> <p>(a) The requirement for all newly registered vehicles to comply with the National III emission standard has been advanced to 1 September 2006.</p> <p>(b) From January to September 2008, spot checks were conducted on a total of 7 411 motor vehicles. 1 581 motor vehicles were required to carry out maintenance repairs within the specified period.</p> <p>(c) The “blacklist” of vehicles with excessive emissions was first published on the Guangzhou Environmental Protection website in August 2007.</p> <p><u>Shenzhen</u></p> <p>(a) A catalogue of motor vehicles complying with the National III emission standard has been implemented since 1 July 2007.</p> <p>(b) A reporting and joint investigation system for smoky vehicles has been established.</p>

Measures	Implementation Programme	Progress (Up to 30 November 2008)
	<p>To study the feasibility of advancing the implementation of National IV emission standard for light-duty vehicles by 2010.</p> <p>To study the feasibility of advancing the implementation of National V emission standard for heavy-duty vehicles by 2010.</p>	<p>Preparatory work is being conducted.</p>
	<p>To strengthen management on regular inspections of in-use motor vehicles to make sure that the required environmental performance is met.</p>	<p>The in-use motor vehicles inspection/maintenance system is progressively implemented and improved. Non-compliance motor vehicles are prohibited from using the roads.</p> <p><u>Shenzhen</u> The pollutant emissions inspection and mandatory maintenance system for motor vehicles is implemented since 1 December 2007.</p>
	<p>To experiment a labelling system on the environmental categorization of in-use vehicles in key cities, and to regulate and restrict vehicles of certain categories using the road according to the ambient air quality.</p>	<p><u>Shenzhen</u> An environmental labelling system for the categorization of motor vehicles has been introduced.</p> <p><u>Guangzhou</u></p> <p>(a) Starting from 1 January 2008, motor vehicles are granted environmental labels in accordance with performance.</p> <p>(b) As at September 2008, a total number of 448 150 environmental labels were issued to vehicles, accounting for 41% of all vehicles in the city.</p>
	<p>(New item included in 2008) To establish a provincial-wide inspection and information management network for motor vehicles.</p>	<p>To be completed by December 2010.</p>



<b>Measures</b>	<b>Implementation Programme</b>	<b>Progress (Up to 30 November 2008)</b>
	To vigorously promote the sale of motor vehicle fuel complying with the National III standard in the province.	<p>Guangdong Province has already announced the local National III standard for motor fuel in August 2006.</p> <p>The extension and reconstruction project of Sinopec's Guangzhou subsidiary was commissioned on 9 September 2006. The company is now capable of producing motor fuel complying with the National III standard.</p> <p>All petrol filling stations in Shenzhen and Guangzhou have been supplying National III standard motor fuels since 16 April 2007 and 1 May 2008 respectively. From 1 July 2008, the supply network has been expanded to cover Zhongshan, Dongguan and Zhuhai.</p>
	(New item included in 2008) To give consideration to advance introduction of the National IV standard motor fuel.	Being implemented.
	To study ways to control the growth of motorcycles in key cities.	Motorcycles have been banned from travelling in the urban areas in Guangzhou and Dongguan since 1 January 2007 and 1 September 2007 respectively.

**Environment Bureau  
January 2009**

**Schedule for Closing Down  
Major Small-scale Thermal Power Generating Units  
in the Cities of Pearl River Delta Economic Zone between 2006 and 2010**

Cities	Capacity to be Closed Down (MW)	Time and Capacity(MW)			
		2007	2008	2009	2010
Guangzhou	2 336	570	500	1 265	-
Shenzhen	765	682	83	-	-
Zhuhai	229	-	229	-	-
Huizhou	250	-	250	-	-
Dongguan	350	-	-	350	-
Zhongshan	519	-	519	-	-
Foshan	2 043	-	2 009	34	-
Jiangmen	549	399	-	150	-
Zhaoqing	147	-	-	147	-
<b>Total</b>	<b>7 187</b>	<b>1 650</b>	<b>3 591</b>	<b>1 946</b>	<b>-</b>

**Environment Bureau  
January 2009**

**Schedule for Phasing Out Cement Plants  
in the Cities of Pearl River Delta Economic Zone  
during the 11<sup>th</sup> Five-year Plan Period**

<b>Pearl River Delta Cities</b>	<b>Capacity to be Phased Out (Million Tonnes)</b>
Guangzhou	12.77
Shenzhen	-
Zhuhai	0.3
Huizhou	1.9
Dongguan	3.03
Zhongshan	0.29
Foshan	9.34
Jiangmen	-
Zhaoqing	0.9
<b>Total</b>	<b>28.53</b>

**Environment Bureau  
January 2009**

**Schedule for Phasing Out Iron and Steel Plants  
in Guangdong Province  
between 2007 and 2010**

<b>Time</b>	<b>Production Capacity of Steel Plants to be Phased Out (Million Tonnes)</b>	<b>Production Capacity of Iron Plants to be Phased Out (Million Tonnes)</b>
2007	3	0.1
2008	1.91	0.37
2009	2.77	-
2010	7.34	1.15
<b>Total</b>	<b>15.02</b>	<b>1.62</b>

**Environment Bureau  
January 2009**