

Environmental Protection
Department

**Agreement No.
CE57/2006 (EP) Review
of the Air Quality
Objectives and
Development of a Long
Term Air Quality
Strategy for Hong Kong
- Feasibility Study**

Appendix C

Legislation and Policy in
Hong Kong and PRD

ARUP

C1 Legislation and Policy in Hong Kong and PRD

C1.1 Current HKSAR Air Quality Policies

C1.1.1 Management Framework

The main air quality management strategies on air quality in Hong Kong include:

- Implementing a wide range of measures to control emissions from motor vehicles, power plants, and industrial and commercial processes locally.
- Working with Guangdong Provincial Authorities to implement a joint plan to tackle the regional air quality problem.
- Imposing emission reduction target for the power plants.
- Keeping in pace with Euro standards for vehicular emission.
- Reviewing the effectiveness of implemented air quality strategy.
- Promoting energy efficiency.

The strategy on marine navigation is dictated by international regulation with the Protocol of 1997 (MARPOL Annex VI) for the prevention of Air Pollution from ships entered into force internationally on 19 May 2005 (http://www.marinediesels.info/2_stroke_engine_parts/Other_info/annex_vi.htm). The Merchant Shipping (Prevention of Air Pollution) regulations (Cap 413M) by Marine Department has been enacted in 1 June 2008 (<http://www.hkleg.gov.hk/hk/legis/en/reg/413M/>). The Regulation imposes restrictions on ship emissions of harmful substances such as ozone-depleting substances, VOC, NO_x and SO_x. It also seeks to control the quality of fuel oil used on board vessels and regulates shipboard incineration.

In the Policy Address 2007 – 08 (Office of Chief Executive, 2007), it included the introduction of new policy in the protection of the environment aiming at developing Hong Kong into a quality global metropolis. In view of the crisis of global warming, the government has targeted to raise public awareness of climate change and to introduce energy saving measures, including the public consultation on the proposed mandatory implementation of the Building Energy Codes by means of legislation. The legislative work related to the Energy Efficiency Labelling Scheme (first phase) for household electrical appliances has been completed, and the government has initiated the second phase of the programme. To improve the air quality, the government has proposed the reduction of emissions by introducing cleaner vehicle fuels and improving the quality of industrial and power generation fuels, such as the installation of desulphurisation equipment and the adoption of cleaner fuels in local power plants and the legislation on replacing industrial diesel with ultra low sulphur content in all industrial and commercial processes. Subject to feedbacks from public consultation, it is proposed to require motorists to switch off idling vehicle engines to improve roadside air quality. The feasibility of requiring all vessels plying the harbour to use high-quality fuel and the option of road pricing using new high tech system will also be studied. Moreover, programme will be initiated to assist and encourage Hong Kong-owned factories within the PRD region to adopt clean production technologies and processes.

In the Policy Address 2008–09 (<http://www.policyaddress.gov.hk/08-09/eng/policy.html>), the Government is considered to press ahead with sustainable development. It is recognized that there is a need to work hand-in-hand with neighbouring areas to foster the development of an economy that is based on low energy consumption and low pollution in the PRD Region. To further strengthen the co-operation on environmental protection, the Government has reached a consensus with the Guangdong Provincial Government on jointly transforming the PRD Region into a green and quality living area under the principle of promoting environmental protection and sustainable development. The goal is to enhance the appeal and competitiveness of the Province and the Region. To achieve this goal, Hong Kong and

Guangdong will work together in the areas of post-2010 emission reduction arrangements, the optimization of the fuel mix for power generation, the development and wider use of renewable energy, vehicle emissions reductions, enhanced conservation and greening, scientific research, as well as publicity and education.

EPD has conducted three consultation forums – one for the professionals on 18 December 2007, and two for the general public on 31 January 2008 and 20 March 2009 to obtain initial public views on the subject of the new AQO and emission reduction strategies.

C1.1.2 Legislation and Policies

(http://www.epd.gov.hk/epd/english/laws_regulations/envir_legislation/leg_air.html)

C1.1.2.1 Air Pollution Control Ordinance (Cap 311)

The Air Pollution Control Ordinance (APCO) (Cap 311) (http://www.legislation.gov.hk/blis_export.nsf/CurAllEngDocAgent?OpenAgent&Chapter=311) is the principal law for managing air quality. Regulations under the Ordinance covers specific areas related to air pollution, such as power plant emissions, motor vehicle fuel and emissions, and industrial emissions. Air pollution from vessels, railways locomotive and aircraft is excluded from the APCO. A set of Air Quality Objectives (AQO) was established for 7 air pollutants, i.e. SO₂, NO₂, CO, O₃, lead, TSP and PM₁₀. The EPD is tasked to achieve these objectives and to maintain the quality so achieved.

Section 6 and 7 of the APCO provides the legal basis for the Government to establish the AQO:

- (a) The Chief Executive in Council shall, after consultation with the Advisory Council on the Environment, by order published in the Gazette, declare any part of the Hong Kong to be an air control zone.
- (b) The Secretary shall, after consultation with the Advisory Council on the Environment, establish for each air control zone air quality objectives or different objectives for different parts of a zone.
- (c) The Secretary shall publish air quality objectives for an air control zone by issuing a technical memorandum which may specify different objectives for different parts of the zone.
- (d) Air quality objective shall be amended from time to time by the Secretary, after consultation with the Advisory Council on the Environment.

Under Section 4 of the APCO, the Chief Executive shall appoint a public officer to be the air pollution control authority. The EPD is the principal department for enforcement of APCO, under the existing institutional arrangement.

Air Pollution Control (Furnaces, Ovens and Chimneys) (Installation and Alternation) Regulations (Cap 311A): any installation or alternation of fuel-burning equipment such as steam boiler in factory, cooking stove in restaurant, emergency generator set in buildings etc, requires approval from EPD. The type, grade and quantity of fuel to be used for the facility are specified.

Air Pollution Control (Dust and Grit Emission) Regulations (Cap 311B): stipulate the emission standards for particulate emissions from stationary combustion sources.

Air Pollution Control (Air Control Zones) (Declaration) (Consolidation) Order (Cap 311E): provides for consolidated declaration of Air Control Zone. A total of ten air quality control zones has been declared under the APCO, they are:

- Harbour Air Control Zone;
- Tsuen Wan – Kwai Chung Air Control Zone;
- Junk Bay Air Control Zone;
- Lantau Air Control Zone;

- Fanling – Sha Tau Kok Air Control Zone;
- Port Shelter Air Control Zone;
- South Hong Kong Island – Lamma Air Control Zone;
- Tolo Air Control Zone;
- Tuen Mun Air Control Zone; and
- Yuen Long Air Control Zone.

Air Pollution Control (Specified Processes) Regulations (Cap 311F): Specified Processes are required to use the Best Practicable Means (BPM) to minimise the air pollutant emissions. A total of 31 Specified Processes is listed in Schedule 1 of APCO. The Legislative Council shall amend the list of Specified Processes.

The Specified Processes under the Ordinance are acrylates works, aluminium works, cement works, ceramic works, chlorine works, copper works, electricity works, gas works, iron and steel works, metal recovery works, mineral works, incinerators, petrochemical works, sulphuric acid works, tar and bitumen works, frit works, lead works, amines works, asbestos works, chemical incineration works, hydrochloric acid works, hydrogen cyanide works, sulphide works, pathological waste incinerators, organic chemical works, petroleum works, zinc galvanising works, rendering works, non-ferrous metallurgical works, glass works and paint works.

Air Pollution Control (Fuel Restriction) Regulations (Cap 311I): imposes a territory-wide restriction on the sulphur content of both liquid (<0.005% sulphur) and solid fuel (<1% sulphur) used by general industries. In Shatin, only gaseous fuel is allowed.

Air Pollution Control (Vehicle Design Standards) (Emission) Regulation (Cap 311J): newly registered motor vehicles to comply with emission standards. The current emission standards for newly registered vehicles are Euro IV, which are in line with that of the European Union and the United States. The EPD and Transport Department are responsible for enforcement of the regulation.

Air Pollution Control (Motor Vehicle Fuel) Regulation (Cap 311L): prohibits the supply, distribution and sale of motor vehicles fuels that do not meet the specifications. Sale of leaded petrol is prohibited. The EPD, Transport Department and Hong Kong Police Force are responsible for enforcement of the regulation.

Air Pollution Control (Construction Dust) Regulation (Cap 311R): requires contractors to take dust reduction measures for construction work.

Air Pollution Control (Petrol Filling Stations)(Vapour Recovery) Regulation (Cap 311S): requires petrol dispensers and petrol storage tanks of petrol filling stations and petrol delivery vehicles to be equipped with effective vapour recovery system and to observe good practice during petrol unloading and vehicle refuelling.

Air Pollution Control (Emission Reduction Devices for Vehicles) Regulation (Cap 311U): requires pre-Euro diesel vehicles to have an emission reduction device for licence renewal. The EPD and Transport Department are responsible for enforcement of the regulation.

Air Pollution Control (Dry-Cleaning Machines) (Vapour Recovery) Regulation (Cap 311T): requires dry-cleaning machines, using perchloroethylene (PCE) as a dry-cleaning agent, to be equipped with a vapour recovery system, and to meet the stipulated emission standard.

Air Pollution Control (Volatile Organic Compounds) Regulation (Cap 311W): impose maximum limits on the volatile organic compound content of architectural paints coatings, printing inks and selected consumers products to reduce total emission of VOCs from these products to the atmosphere. The regulation also requires annual reporting of sales amount for regulated products; labeling, information display and prior notification of regulated paints;

and installation of emission reduction device in lithographic heatset web printing machines. The regulation has been implemented in phase and will be fully implemented in 2009.

C1.1.2.2 Environmental Impact Assessment Ordinance (Cap 499)

(http://www.legislation.gov.hk/blis_export.nsf/CurAllEngDocAgent?OpenAgent&Chapter=499)

Designated projects under the Ordinance need to follow the statutory environmental impact assessment (EIA) process and requires Environmental Permits for their construction and operation.

- Designated projects are listed in Schedule 2 and 3 under the Ordinance. According to Section 4 of the Ordinance, the Secretary shall amend the lists of designated projects by order published in the Gazette.
- The Secretary has issued Technical Memorandum on Environmental Impact Assessment Process under Section 16(5) of the Ordinance, by order published in the Gazette. The technical memorandum sets out principles, procedures, guidelines, requirements and criteria for the technical content of project profile, EIA study brief and EIA report. The AQO are adopted as the criteria for evaluating air quality impact to the air sensitive receivers in the technical memorandum. The technical memorandum is not a subsidiary legislation.

The Director of Environmental Protection is responsible for enforcement of the Ordinance.

Domestic premises, hotel, hostel, hospital, clinic, nursery, temporary housing accommodation, school, educational institution, office, factory, shop, shopping centre, place of public workshop, library, court of law, sports stadium or performing arts centre are air sensitive receiver defined in the technical memorandum.

C1.1.2.3 Road Traffic Ordinance (Cap 374)

(<http://www.hkllii.org/hk/legis/en/ord/374/>)

The Ordinance regulates road traffic, vehicle and users of roads and related matters; includes provisions to limit pollution from vehicles. It limits the pollution from motor vehicles by enforcing the emission standards through requiring the vehicles to take an emission tests at authorized emission testing centres. The authorizations of such emission testing centres are stipulated under this Ordinance. Under Section 13 of the Ordinance, the Commissioner for Transport, Commissioner of Police and the Director of Highways are responsible for enforcement of Ordinance.

Road Traffic (Construction and Maintenance of Vehicles) Regulations: specifies emission limits for in-service vehicles.

C1.1.2.4 Public Health and Municipal Services Ordinance (Cap 132)

(http://www.legislation.gov.hk/blis_export.nsf/CurAllEngDocAgent?OpenAgent&Chapter=132)

Make provision for urban services and public health, including control of nuisance caused by emission of fumes. Under Schedule 3 of the Ordinance, the Director of Drainage Services, Director of Food and Environmental Hygiene, Secretary for Food and Health, Secretary for Home Affairs, Director of Leisure and Cultural Services, Director of Health, Director of Buildings, and Director of Lands are responsible for enforcement of the Ordinance.

C1.1.2.5 Building (Demolition Works) Regulations (Cap 123C)

(http://www.legislation.gov.hk/blis_export.nsf/CurAllEngDocAgent?OpenAgent&Chapter=123)

The regulation prevents nuisance from the building demolition works. It requires authorized person and registered specialist to carry out any demolition works. The Director of Buildings is responsible for enforcement of the regulation.

C1.1.2.6 Shipping and Port Control Ordinance (Cap 313)

(http://www.legislation.gov.hk/blis_export.nsf/CurAllEngDocAgent?OpenAgent&Chapter=313)

The Ordinance regulates smoke emissions from control ports, vessels and navigation. The Director of Marine is responsible for enforcement of the Ordinance.

C1.1.2.7 Merchant Shipping (Prevention and Control of Pollution) Ordinance (Cap 413)

(http://www.legislation.gov.hk/blis_export.nsf/CurAllEngDocAgent?OpenAgent&Chapter=413)

The Ordinance provides for the prevention and control of pollution from ships and for incidental or related matters. The Director of Marine is responsible for enforcement of the Ordinance.

Merchant Shipping (Prevention of Air Pollution) Regulation (Cap 413M): The Regulation imposes restrictions on ship emissions of harmful substances such as ozone-depleting substances, VOC, NO_x and SO_x. It also seeks to control the quality of fuel oil used on board vessels and regulates shipboard incineration. Moreover, survey and certification will be required for ships of 400 gross tonnage or above. This Regulation is applicable to all Hong Kong registered ships, foreign ships within Hong Kong waters, as well as “local vessels” as defined in the Merchant Shipping (Local Vessels) Ordinance, Cap. 548, including locally licensed vessels, Hong Kong registered river trade vessels and PRC coastal/river trade vessels trading to Hong Kong. Marine Department is responsible for enforcement of the regulation.

C1.1.2.8 Town Planning Ordinance (Cap 131)

(http://www.legislation.gov.hk/blis_export.nsf/CurAllEngDocAgent?OpenAgent&Chapter=131)

This Ordinance aims to promote the health, safety, convenience and general welfare of the community by making provision for the systematic preparation and approval of plans for the lay-out of areas of Hong Kong. Air quality is closely related to town planning, and the AQO are adopted as criteria to satisfy at the air sensitive receivers when preparing development plans, planning transport and determining application for planning permission. Headed by the Director of Planning, the Planning Department is the executive arm of the Town Planning Board, which is responsible for formulating, monitoring and reviewing town plans, planning policies and associated programmes for the physical development of Hong Kong

C1.1.3 Policies and Programmes

The following section describes the air quality policies and programmes in Hong Kong.

C1.1.3.1 Policy Address

The 2007-2008 (<http://www.policyaddress.gov.hk/07-08/index.html>) and 2008-2009 Policy Addresses (<http://www.policyaddress.gov.hk/08-09/eng/policy.html>) have outlined strategies and specific measures for air quality protection in Hong Kong. The policy addresses are focused on the emissions reduction by Power companies, the adoption of clean fuel, the promotion of clean production and the promotion of environmental protection and conservation as summarised below in **Table C1.1**.

Table C1.1: Key points in 2007-2008 and 2008-2009 Policy Address

Target	2007- 2008 Policy Address	Policy update	2008- 2009 Policy Address
Emissions Reduction by Power Companies	The Government seeks to improve local air quality through linking the power companies' permitted rate of return to their achievement of emission caps.	The Scheme of Control Agreements were signed with the 2 power companies on 7 January 2008 in that the permitted rate of return of the power companies is linked to their emission performances against the emission caps.	<ul style="list-style-type: none"> The Memorandum of Understanding signed between the HKSAR (Hong Kong Special Administrative Region) Government and the National Energy Administration on 28 August 2008 ensures a long-term and stable supply of nuclear

Target	2007- 2008 Policy Address	Policy update	2008- 2009 Policy Address
			electricity and natural gas. <ul style="list-style-type: none"> The Government 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%.
Clean Fuel	<ul style="list-style-type: none"> Legislate on replacing industrial diesel with ultra low sulphur diesel in all industrial and commercial processes. Switch off idling vehicle engines to improve roadside air quality subject to public consultation. Study the feasibility of requiring all vessels plying the harbour to use high-quality fuel. Re-examine the option of road pricing using new high technology. 	<ul style="list-style-type: none"> Diesel fuel users in industrial and commercial sectors will have to switch to using ultra low sulphur diesel (ULSD) effective on 1 October 2008. A 5-month public consultation on “a proposal to ban idling vehicles with running engines” have been launched which ended on 31 March 2008. The Merchant Shipping (Prevention of Air Pollution) Regulation became effective on 1 June 2008 imposes restrictions on the emissions from ships of emission on nitrogen oxide, volatile organic compounds and sulphur oxide. The option of road pricing system is still under review. 	<ul style="list-style-type: none"> The Government will enhance energy efficiency, use clean fuels, rely less on fossil fuel, and promote a low carbon economy — an economy based on low energy consumption and low pollution.
Clean Production	The Government will propose to assist Hong Kong-owned factories in the PRD region to adopt clean production technologies and processes.	The Cleaner Production Partnership Programme was officially launched on 18 April 2008.	
Promote Environmental	The Government proposes to inject \$1	In 2008, the Finance Committee of the	<ul style="list-style-type: none"> The Government enacted the legislation

Target	2007- 2008 Policy Address	Policy update	2008- 2009 Policy Address
Protection and Conservation	billion into the Environment and Conservation Fund (ECF) for educational, research and technology demonstration projects as well as environmental protection and conservation activities.	Legislative Council has approved the \$1 billion fund to the Environment and Conservation Fund (ECF).	on the Mandatory Energy Efficiency Labelling Scheme in May 2008. <ul style="list-style-type: none"> Propose amendments to the Energy Efficiency (Labelling of Products) Ordinance in 2009 for the second phase of the Scheme. Study the need to restrict the sale of incandescent light bulbs. Assess the problem of energy wastage of external lighting and study the feasibility of tackling the problem through legislation.

C1.1.3.2 Overall Emission Reduction Target

The HKSAR Government has been pursuing various emission reduction or prevention measures and co-operating with the Guangdong government to reduce four major air pollutants, sulphur dioxide (SO₂), nitrogen oxides (NO_x), Respirable Suspended Particulates (PM₁₀) and volatile organic compounds (VOC), in the PRD Region by Year 2010, using Year 1997 as the base year. The Year 2010 reduction targets are shown in **Table C1.2** below. (http://www.epd.gov.hk/epd/english/environmentinhk/air/data/emission_inve.html#3)

Table C1.2: Year 2010 reduction targets

Pollutant	Emission Level in Year 1997 (tonnes) (Hong Kong)	Reduction Target for Year 2010 (tonnes)
SO ₂	66,200	-40%
NO _x	124,000	-20%
PM ₁₀	11,500	-55%
VOC	68,800	-55%

To achieve the above reduction targets, the HKSAR Government has developed a series of policies and programmes for different sectors including energy, transportation, production industry, urban planning and conservation. They are described in the following sections.

C1.1.3.3 Energy Sector

(http://www.epd.gov.hk/epd/english/environmentinhk/air/prob_solutions/files/brief-power_plant_e.pdf)

The objectives of energy policy are to ensure that the energy needs of the community are met safely, efficiently and at reasonable prices; and to minimise the environmental impact of energy production and use and promote the efficient use and conservation of energy.

The government's environmental policy towards the power companies are:

- The power companies should use the best practicable means (BPM) to reduce emissions as required in the APCO and at the same time enhance the operational efficiency of the power plants and the combustion and generation efficiencies;
- Power companies must use low-sulphur coal for the existing coal-fired generating units;
- All new generating units constructed after Year 1997 should be powered by natural gas.
- Emissions caps are set in any SP licences issued or renewed to power companies under the APCO; and
- Power companies should actively consider adopting the most effective economic tools (including emission trading) to achieve the emission reduction targets.

Emission Cap on Power Station

Power stations in Hong Kong are licensed to operate under the Air Pollution Control (Specified Processes) Regulations, which requires the use of “Best Practicable Means (BPM)” to control their emissions. Emission caps have already been imposed onto Castle Peak, Black Point and Lamma Power Stations through their renewed licences, and kept to the practical minimum value, which require them to progressively reduce the emission to meet reduction targets for 2010. The permitted rate of return of the power companies are linked to their achievement of the emission caps. (<http://www.policyaddress.gov.hk/06-07/eng/pdf/agenda5.pdf>) The detail emission caps of the three Power Stations were listed in **Table C1.3** below.

Table C1.3: Emission caps of three Power Stations in 2008, 2009 and 2010

Parameters (unit: tonnes)	Castle Peak Power Station			Black Point Power Station			Lamma Power Station		
	2008	2009	2010	2008	2009	2010	2008	2009	2010
SO ₂	41,400	39,400	7,135	520	520	8,617	28,200	22,500	9,370
NO _x	27,650	27,300	12,099	2,500	2,500	14,612	17,000	15,890	15,890
PM ₁₀	1,165	1,115	358	65	65	433	810	560	470

Use of Clean Energy

A mix of fuels (coal, nuclear, gas, oil) is used to maintain secure energy supply to Hong Kong. More than 50% of energy supply is generated by coal burning. The coal supply comes from a variety of sources with different sulphur contents. Currently, low sulphur coal with not more than 1% sulphur content is used by power companies. The power companies are increasing the use of ultra-low sulphur coal and natural gas for power generation to meet the emission caps. The CLPP has increased the use of EnviroCoal with an ultra-low sulphur content as low as 0.1% since Year 2005. (<http://www.cleanair.hk/eng/bestpractices/CLPClean%20Air%20Charter%20Progress2006.pdf>). In 2007, ultra-low sulphur coal accounted for over 50% of total coal delivered (4.6 million tonnes, compared to 3.4 million tonnes in 2006). (<http://notice.singtao.com/ADMA/0002/epdf/LTN20080228040.pdf>)

On the wider use of natural gas, EPD issued on 22 June 2006 the licence and emission cap for HEC's first gas-fired generation unit (unit L9). The first combined cycle gas turbine was connected to the grid in July 2006. Emissions from HEC are reduced after full operation of this gas-fired unit.

After signing the Memorandum of Understanding (MOU) on energy co-operation between the Hong Kong SAR Government and National Energy Administration on 28 August 2008, the Government and CLP Power Hong Kong Limited have set up a Working Group to follow up on the implementation of the MOU. Relevant energy enterprises on both sides are pursuing co-operation to follow up the implementation. The Shenzhen - Hong Kong spur line of the

Second West-East Gas Pipeline and the LNG terminal in Mainland side to be jointly constructed by energy enterprises of both sides are anticipated to be completed in 2013. Both projects would help provide new sources of natural gas to Hong Kong. Moreover, energy enterprises on both sides are also following up on the renewal of natural gas supply agreement for a further term of 20 years.

Emission Reduction Proposals of Power Companies

(http://www.epd.gov.hk/epd/english/environmentinhk/air/prob_solutions/files/brief-power_plant_e.pdf)

Both HEC and CLPP have developed control measures to reduce emission from their plants, taking their constraints into consideration. Emission reduction plans of the two power companies are given in **Table C1.4** below.

Table C1.4: Emission reduction plans of HEC and CLPP

	Emission Reduction Measures	Commission Date	
HEC			
Reducing SO ₂ emissions	To retrofit two 350MW and one 250MW coal-fired generating units with Flue Gas Desulphurization (FGD) Systems	July 2009 and April 2010 respectively	
Reducing NO _x emissions	To retrofit two 350MW coal-fired generating units with Low- NO _x Burners	July 2009 and April 2010 respectively	
Use of natural gas	To install one 335MW gas-fired units in phase.	The gas unit has been in operation since October 2006.	
CLPP			
Reducing SO ₂ emission	To retrofit four 677MW coal-fired generating units with FGD Systems	4th quarter of 2009, 1 st quarter and 4th quarter of 2010, 1st quarter of 2011 respectively.	
Reducing NO _x emission	To retrofit four 677 MW coal-fired generating units with selective catalytic reduction systems	4th quarter of 2009, 1 st quarter and 4th quarter of 2010, 1st quarter of 2011 respectively	
Use of natural gas	To commission two 312.5MW gas-fired combined cycle gas turbine units	commissioned in 2005 and 2006 respectively	
Use of clean coal	Secured a five-year contract for ultra low sulphur coal with sulphur content of down to 0.1%	Since 2005	

Use of Renewable Energy

The Government set out strategy on the development of renewable energy in the A First Sustainable Development Strategy for Hong Kong, in May 2005 (www.susdev.org.hk/archive/archive/en/pdf/1stSDStrategyE.pdf). One of the key targets is to generate 1-2 % of Hong Kong's total electricity needs from renewable sources by Year 2012,

subject to regular review to take account of technological advances and emerging sustainability considerations.

A Technical Guidelines on Grid Connection of Small-scale Renewable Energy Power Systems

(http://www.emsd.gov.hk/emsd/e_download/cgi/TG_on_grid_connection_eng_20071101.pdf) was released by the EMSD to provide information on the safety, equipment protection, reliability, and power quality aspects of small-scale renewable energy systems. In Year 2005, the EMSD put into service the largest photovoltaic (PV) installation in Hong Kong (350kW) and a 1kW small wind turbine on the roof of the EMSD Headquarters building.

EPD has also installed active gas extraction systems at some strategic and closed landfills (http://www.epd.gov.hk/epd/english/environmentinhk/waste/prob_solutions/msw_lgu.html).

The collected landfill gas is utilised as energy source for the treatment of leachate (waste water generated due to degradation of waste at the landfill) at the on-site leachate treatment plant.

EPD also runs a scheme with Towngas to utilise landfill gas to generate electricity and act as heating fuel. The landfill gas as heating fuel subsisting for fossil fuel naphtha could reduce wastage of energy and saves natural resources, as naphtha comes from the cracking of fossil fuel. The landfill gas utilization plant sited at Shuen Wan Landfill was commissioned in July 1999, and gas generation is expected to last beyond the year 2010. (http://www.epd.gov.hk/epd/english/environmentinhk/waste/prob_solutions/msw_lgu.html)

Both CLPP and HEC have agreed to set up production-scale wind turbines. HEC has erected a wind turbine on Lamma Island and commenced operation in 2006 (<http://www.german-renewable-energy.com/Renewables/Navigation/Englisch/Windkraft/case-studies,did=166998.html?view=renderPrint>). The two power companies are conducting EIA studies for building off-shore commercial wind farms in Hong Kong waters. CLP has presented the EIA of the proposed off-shore wind farm of up to 200MW in the south-eastern waters of Hong Kong for public consultation.

In the new Scheme of Control Agreement signed in January 2008, the following measures to encourage the use of renewable energy are incorporated¹ :

- To institute a standard arrangement for renewable energy users to connect to the grid for backup supply;
- To give a higher rate of return for renewable energy infrastructure than all other assets; and
- To provide 'bonus' return if power companies achieve the target for using renewable energy.

(http://www.enb.gov.hk/en/resources_publications/policy_consultation/files/consultation_paper_stage2.pdf)

Emissions Trading

The Hong Kong and Guangdong Governments have set up an Emission Trading Pilot Scheme

(http://www.epd.gov.hk/epd/english/news_events/legco/files/EAP_Emissions_Trading_070226_Annex_EN.pdf) to facilitate thermal power plants in Pearl River Delta (PRD) region trading emission credits for pollutant emissions. By making use of market forces and the flexibility of emissions trading, power plants can develop different cost-effective emission reduction projects. The Pilot Scheme is intended to support emissions trading of SO₂ whilst the trading of NO_x and PM₁₀ has also been included. The implementation framework of the pilot scheme was announced on 30 January 2007.

Pollutant emissions from power plant in Hong Kong are controlled by specified process licences under the APCO. In July 2008, the APCO is amended to facilitate the use of

emissions trading as a means to comply with the emission caps for power plants.
(http://www.epd.gov.hk/epd/english/news_events/press/press_070130a.html)

Government Incentives

(http://www.heh.com/hehWeb/AboutUs/SchemeOfControlAgreement/Index_en.htm)

(http://www.enb.gov.hk/en/resources_publications/agreement/index.html)

(https://www.clpgroup.com/Media/RelArc/2008/Archive/Pages/20080107_01.aspx?lang=en)

The Government have included a number of incentives and penalty arrangements in the new Scheme of Control Agreements signed with HEC and CLPP on January 2008 to take more proactive steps to reduce emissions and sustain strict compliance with the environmental requirements. These arrangements include:

- Linking the rates of return of the two power companies to their environmental performances. There will be financial incentives in terms of higher rates of return for regarding better than required performance in reducing air pollutant emissions and improving air quality. The new arrangements will also provide for financial disincentive in terms of lower rates for return for emitting more pollutants than permissible; and
- Providing higher rates 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, also as to support them to implement more environment-friendly measures.

Prevailing Challenge on Energy Sector

Increasing demand on electricity: Power plants contribute 91% of Hong Kong's sulphur dioxide (SO₂) emissions, and about half of NO_x and PM₁₀ emissions in Year 2005. Both CLPP and HEC have installed low NO_x burners to reduce emissions and HEC has also installed three flue gas desulphurisation units. However, the benefits of these devices are being eroded by increased power generation. Demand is being pushed up by the strong economies in Hong Kong and Mainland China.

Power supplies to Mainland: In Year 2005, CLPP sold 4497 GWh to Guangdong Province (13.2% of CLPP's sales). Much of this electricity was coal generated, using reserve in its installed generation capacity. This will have an implication on Hong Kong air quality.

Unstable supply of clean fuel: CLPP has been burning gas transport from Hainan at its Black Point Power Station. With the diminishing of gas reserve, CLPP has reduced its use of natural gas for power generation. On the other hand, the use of ultra low sulphur coal is controlled by the availability of the fuel.

(<https://www.clpgroup.com/LNG/LNG/Need/Pages/WhydoweneedLNG.aspx>)

C1.1.3.4 Transport Sector

(http://www.epd.gov.hk/epd/english/environmentinhk/air/prob_solutions/strategies_apc.html)

(http://www.epd.gov.hk/epd/english/environmentinhk/air/prob_solutions/cleaning_air_atroad.html)

Road Transport

Motor vehicle is a major cause of street-level air pollution in Hong Kong and it contributes to ambient NO_x and PM₁₀ levels of Hong Kong. The HKSAR government has been working for years to control emissions from motor vehicles. In Year 2000, the HKSAR government embarked on a comprehensive motor emission control programme to reduce PM₁₀ by about 80% and NO_x by about 40% in the urban area by end 2005. The main initiatives included:

- Adopt tighter fuel and vehicle emission standards;
- Adopt cleaner alternative to diesel where practicable;

- Control emissions from the remaining diesels with devices that trap pollutants;
- Strengthen vehicle emission inspections and enforcement against smoky vehicles; and
- Promote better vehicle maintenance and eco-driving habits.

The HKSAR government controls motor vehicle emissions with a comprehensive vehicle emission control programme. New vehicles are Euro IV standards and pre Euro standards are expected to be phasing out gradually. Between Years 1999 and 2005, roadside NO_x has been reduced by 17% and PM₁₀ by 14%. To strengthen the effort on improving roadside air quality, the government launched new measures on April 1, 2007 and April 1, 2008 respectively to reduce vehicle emissions:

- Encourage replacement of pre-Euro and Euro I diesel commercial vehicles (2007);
- Tax incentives for environment-friendly petrol private cars (2007);
- Tax incentives for environment-friendly commercial vehicles (2008)

Tighter motor fuel and vehicle emission standards

Vehicle fuel standards:

- Petrol – The EPD tightened the sulphur content in unleaded petrol from 0.015% to 0.005% since January 2005 in tandem with the European Union.
- Ultra low sulphur diesel (ULSD) - ULSD has a sulphur content of 0.005%, which is the Euro IV requirement for motor vehicle diesel. It became the only motor diesel fuel available at petrol filling stations in Hong Kong, after the Government introduced a concessionary duty on ULSD in July 2000. Since April 2002, ULSD has been the statutory minimum requirement for motor vehicle diesel, 3 years ahead of the European Union. Hong Kong is also the first place in Asia to introduce ULSD on a full scale for its vehicle fleet.
- Euro V diesel - On December 1 2007, the Government offered a concessionary duty rate of \$0.56 per litre for Euro V diesel, which has a sulphur content of 0.001%, for two years. Since then, Euro V diesel has been available at all petrol filling stations in Hong Kong. Euro V diesel is suitable for all existing diesel vehicles. As compared with ULSD, fuelling existing diesel vehicles with Euro V diesel can reduce their sulphur dioxide and particulates emissions by 80% and 5% respectively.

Vehicle emission standards: The emission standards for newly-registered vehicles have been progressively tightened since 1995. In Year 2006, the Euro IV emission standards in tandem with the European trends, was implemented. **Table C1.5** presents the implementation schedule of vehicle emission standards in Hong Kong.

Table C1.5: Implementation schedule of vehicle emission standards in Hong Kong

		Private Car	Goods Vehicle	Bus	Light Bus	Taxi	Motor-cycle
Pre-Euro	Pre-ULP	Before Jan 92	< 2.5t Jan 92 > 2.5t - 3.5t Apr 95 > 3.5t Apr 95	Before Apr 95	< 2.5t Before Jan 92 > 2.5t Before Apr 95	Before Jan 92	NA
	ULP	Jan 92	< 2.5 t Jan 92 > 3.5t Apr 95		<2.5t Before Jan 92 >3.5t Before Jan		

		Private Car	Goods Vehicle	Bus	Light Bus	Taxi	Motor-cycle
					95		
	Diesel	Apr 94	Before Apr 95		Before Apr 95	Before Jan 96	NA
Euro I	Petrol	Apr 95	Apr 95	Apr 95	Apr 95	Apr 95	Sept 99
	Diesel					Jan 96	
Euro II	LPG	NA	NA	NA	NA	Aug 01	To be determined
	Petrol	Apr 97	< 1.7t Apr 97 > 1.7t – 3.5t Oct 98 > 3.5t Oct 98	Oct 98	< 1.7t Apr 97 > 1.7t Oct 98	Apr 97	
	Diesel	NA	< 3.5t Oct 98 > 3.5t Apr 97	Apr 97	Oct 98	Jul 99	
Euro III	LPG	NA	NA	NA	Aug 03	Aug 03	
	Petrol	Jan 01	< 1.7t Jan 01 > 1.7t – 3.5t Jan 02 > 3.5t Oct 01	Jan 01	< 1.7t Jan 01 > 1.7t – 3.5t Jan 02 > 3.5t Oct 01	Jan 01	
	Diesel	Apr 98		Oct 01	< 1.7t Jan 01 > 1.7t – 3.5t Jan 02 > 3.5t Aug 03	New registration banned on Aug 01	
Euro IV	LPG	NA	NA	NA	< 1.7t Jan 06	Jan 06	
	Petrol	Jan 06	< 1.7t Jan 06 > 1.7t – 3.5t Jan 07 > 3.5t Oct 06	NA	> 1.7t – 3.5t Jan 07 > 3.5t Oct 06	NA	
	Diesel	Jan 01		Oct 06			
Euro V	LPG	NA	NA	NA	Not yet finalised	Not yet finalised	
	Petrol	Not yet finalised	Oct 09	Oct 09			
	Diesel					NA	

Cleaner alternatives to diesel

LPG taxi programme: The government offered incentives of a one-off grant to taxi owners to encourage replacement of diesel taxis with liquefied petroleum gas (LPG) vehicles. The programme was started in August 2000 and completed at the end of 2003. Nearly all (about 99.9%) taxis had switched to LPG.

LPG/ electric light bus programme: The government started a programme in August 2002 to offer incentives to diesel bus owners to encourage replacement of diesel with LPG or electric ones. The programme was completed at the end of 2005. By May 2008, about 58% of the registered public light buses are LPG.

Controlling emissions from the remaining diesels

Hong Kong has implemented a programme to retrofit pre-Euro diesel vehicles with particulate traps or catalytic converters. More than 24,000 (about 80%) light diesel vehicles, 34,000 (about 96%) heavy diesel vehicles and 2,500 (about 95%) long idle diesel vehicles were fitted with the devices under the retrofit programme. The programme was completed in 2005.

From April 2007, the Air Pollution Control (Emission Reduction Devices for Vehicles) Regulation was amended, requiring all pre-Euro diesel vehicles to install approved emission reduction devices. (<http://www.legco.gov.hk/yr05-06/english/subleg/negative/ln111-06-e.pdf>)

As at end 2007 and 2008, about 2975 and 3087 franchised buses were retrofitted with emission reduction device (ERD) respectively. All franchised buses of pre-Euro and Euro I emission standards have been retrofitted with ERDs. The Transport Department (TD) has been encouraging the franchised bus companies to continue to retrofit ERDs on their buses of Euro II and Euro III emission standards where technically feasible. According to the Environmental Protection Department, the ERDs installed on buses of Euro II and Euro III emission standards can reduce particulate matters, hydrocarbons and carbon monoxides by about 80% to 90%.

Strengthening emission inspection and enforcement

Smoky vehicle control programme: The EPD requires smoky vehicles spotted by accredited spotters to undergo a smoke test within a specified period. Failure to pass the test will result in cancellation of vehicle licence. Chassis dynamometers are also deployed to test diesel vehicle smoke and taking stronger enforcement actions against smoky vehicles. Fixed penalty ticket will be issued to the owners of vehicles failing the smoke test.

Petrol and LPG vehicle emission checks: All petrol and LPG vehicles have been required to undergo an emission check during the annual roadworthiness test since November 2000.

Promoting better vehicle maintenance and eco-driving

Training and seminars on vehicle maintenance: Since August 1999, EPD, in collaboration with the Vocational Training Council and Hong Kong Productivity Council, has been offering training sessions for vehicle mechanics on proper engine repair and maintenance to reduce smoke emissions from diesel vehicles.

As LPG vehicles are relatively new in Hong Kong, seminars are also organised to promote the awareness of the owners on their maintenance.

Campaign on eco-driving: The Government kicked off a campaign in September 2001 to promote "switching off engines while waiting". Guidelines have been issued to the transport trade on this good practice.

Encourage replacement of old diesel commercial vehicles

A one-off grant scheme was launched in 1 April 2007 to encourage owners of pre-Euro and Euro I diesel commercial vehicles to replace their old vehicles. The provisions of grant was within a prescribed period (18 months for pre-Euro vehicles and 3 years for Euro I vehicles) so as to induce the early retirement of old vehicles. The vehicular emission of PM₁₀ and NO_x is expected to be reduced by 74% and 38% respectively, with the scheme.

Tax incentives for environment-friendly petrol private cars

(http://www.epd.gov.hk/epd/english/environmentinhk/air/prob_solutions/environment_friendly_private_cars.html)

A 30% reduction of First Registration Tax, with a cap of \$50,000, is provided for environmental friendly petrol vehicle, from 1 April 2007. Environmental-friendly petrol private car emits 50% less hydrocarbons (HCs) and nitrogen oxides (NO_x) and consume 40% less fuel than conventional petrol Euro IV private cars. The government will review annually the qualifying standards of environmental-friendly vehicles.

Tax incentives for environment-friendly commercial vehicles

(http://www.epd.gov.hk/epd/english/environmentinhk/air/prob_solutions/environment_friendly_commercial_vehicles.html)

To encourage the use of environment-friendly commercial vehicles, which have low emissions, starting from 1 April 2008, reduction in the First Registration Tax (FRT) will be offered to buyers of newly registered environment-friendly commercial vehicles. Commercial vehicles include taxis, light/medium/heavy goods vehicles, public/private light buses public/private non-franchised buses and special purposes vehicles.

Electronic Road Pricing (ERP)

The HKSAR government control the growth of vehicle fleet mainly by increasing the First Registration Tax and Annual Licence Fee. To improve the mobility of people and goods, based on the 'user-pay' principle, the HKSAR government had conducted a feasibility study on Electronic Road Pricing in Year 2001. Findings of the Study suggested that ERP would be technically feasibility in Hong Kong. It was predicted that the overall emissions within the charging areas would be reduced slightly (2% NO_x and 0.4% PM₁₀). However, the air quality of non-charging zone would be deteriorated with the overall redistribution of traffic². In September 2004, the government disclosed that the ERP should not be installed before construction of the Central-Wan Chai Bypass³.

Statutory ban on idling vehicles with running engines

A consultation was launched on 2 November 2007 to seek the public's views on the proposal to introduce a statutory ban on idling vehicles with running engines. The consultation ended on 31 March 2008.

Strengthen the control of emissions from petrol and LPG vehicles

(http://www.epd.gov.hk/epd/english/news_events/legco/files/EA_Panel_081024_eng.pdf)

A proposal is being developed 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. When it is ready, the Government will consult the stakeholders.

Promotion of biodiesel

(http://www.epd.gov.hk/epd/english/news_events/legco/files/EA_Panel_081024_eng.pdf)

To promote the development of the biodiesel market, the Government are proposing to spell out specifications for pure biodiesel and biodiesel blended with motor vehicle diesel in the Air Pollution Control (Motor Vehicle Fuel) Regulation (Chapter 311L) so as to ensure fuel quality, boost users' confidence and help control its impact on the environment. The plan is to implement specifications around early 2010.

Off-road Transport

Navigation

The ocean-going vessels use sulphur-heavy fuel (4.5% sulphur), and their air quality impacts are a concern. According to the 2005 air emission inventory of the Environmental Protection Department, PM₁₀, SO₂ and NO_x emitted from all types of ships account for 7%, 5% and 18% of the total emission in Hong Kong respectively.

The new Merchant Shipping (Prevention of Air Pollution) Regulations set limits on NO_x emission from diesel engines and impose a cap on the sulphur content of marine fuel. Deliberate emission of ozone depleting substances is prohibited.

Under international maritime law, countries can propose their waters to be designated as a 'sulphur emission control area' (SECA), in which ships will be required to burn low-sulphur fuel (<1.5% S). However, the stretch of Hong Kong waters is too small for becoming SECA. Collaboration with the Mainland is required for establishment of SECA in the region.

The majority of local vessels (including ferries) are using diesel fuel with sulphur content of 0.5%.

Civil Aviation

There is no legislation that sets standards for emissions from airplanes in Hong Kong. Major aviation turbine fuel (jet fuel) supplier of Hong Kong, namely ChevronTexaco, ExxonMobil, Kuwait Petroleum, Shell and Sinopec, deliver aviation fuel complying most stringent requirements of American Society for Testing and Materials ASTM D1655 kerosine Type Jet A-1 and United Kingdom Ministry of Defence (MOD) STAN 91-91. Most air pollution due to aviation is produced during landing and take-off, including climb-out, final approach and taxiing.

Off-road mobile emission sources

There is no legislation in force to control off-road mobile emission sources (e.g. mobile equipment in construction sites and container terminals). The HKSAR government is conducting a study to control the emissions of off-road mobile sources operating within the airport and container terminals. Unlike on-road vehicles, at present off-road mobile sources are not required to meet any emission standard when imported for use in Hong Kong. To further reduce air pollution, the study will examine the option of controlling the emissions of off-road mobile sources within the airport and container terminals, with an aim to draw up a control scheme for consulting the stakeholders. The next phase of this study will aim to extend the control scheme to mobile emission sources within construction sites.

(http://www.epd.gov.hk/epd/english/news_events/legco/files/EA_Panel_081024_eng.pdf).

Challenge on Transport Sector

Cross boundary diesel

There are over 1 million vehicles making cross-boundary trips back and forth each month between Hong Kong and Shenzhen. While these vehicles are required to meet the emission standards in Hong Kong, many of them are filled with lower grade diesel (0.035 % Sulphur) in Shenzhen, and driving back to Hong Kong, emitting higher level of pollutants, notably SO₂ in air. The cross boundary diesel has compromised the HKSAR's efforts on combating vehicle emission.

Traffic congestion

The exhaust emission from acceleration and deceleration mode of vehicle during traffic congestion produces large amount of pollutants. Hong Kong has several notable locations where traffic jams commonly occurred (e.g. access areas of the cross harbour tunnels). Roadside air quality in these congested areas is usually poor.

Use of rail transport

Large number of vehicles using road networks contribute to air pollution, in particular NO_x in air. An alternative mode of transport is rail. Railway is a clean form of public transport. It draws 3.5% of electricity generated in Hong Kong and is preferred over road vehicles in terms of energy consumption and air pollution. In Year 2007, Hong Kong has 1977km of road and 210km of railway (i.e. about 10% of road length). The Government are constructing or planning nine strategic highway projects. Currently, there are two new railway projects under construction; and based on the Railway Development Strategy 2000 announced in May 2000, five passenger railway lines will be implemented to meet the increasing transport need due to population growth. Upon the completion of the various railway projects under the Railway Development Strategy, Hong Kong's railway network will expand to about 300 kilometres. (<http://www.gov.hk/en/about/abouthk/factsheets/docs/railway.pdf>)

C1.1.3.5 Production Industry Sector

Combustion

Installation and alternation of furnaces, ovens and chimneys require approval from the EPD. Type, grade and quantity of fuel to be used in these installations also need to be submitted for approval. Fuel with high sulphur content: solid fuel (>1%) and liquid fuel (> 0.005%) for commercial and industrial appliances are prohibited.

The major stationary air polluters, such as power plant, are classified as Specified Process (SP), which are subject to licence control. These SPs are required to use the Best Practicable Means to minimise the air pollutant emission. A total of 31 SPs are identified under the APCO. Noxious and offensive emissions are controlled by the SP licence.

Non-combustion

Vapour recovery systems in petrol stations

In Year 1999, the Government introduced the Air Pollution Control (Petrol Filling Stations)(Vapour Recovery) Regulation (http://www.epd.gov.hk/epd/english/news_events/legco/files/bills_041224_annex.pdf)

requiring petrol filling stations to install a system to recover VOC emissions during the unloading of petrol from petrol tankers into storage tanks (Phase I). Today, all the stations have already been installed with vapour recovery system. To further control VOC emissions, the Regulation was amended in Year 2004, effective on 31 March 2005, to require stations to install a system to recover VOCs emitted during vehicle refuelling (Phase II). While all new stations are required to have this refuelling vapour recovery system, existing stations are required to retrofit with this vapour recovery system before 31 March 2008.

Reduction of emissions from VOC-containing Products

The Air Pollution Control (VOC) Regulation was introduced in April 2007, which imposes maximum limits on the volatile organic compound (VOC) content of architectural paints coatings, printing inks and selected consumers products to reduce total emission of VOCs from these products to the atmosphere. The regulation also requires annual reporting of sales amount for regulated products; labeling, information display and prior notification of regulated paints; and installation of emission reduction device in lithographic heatset web printing machines. The regulation has been implemented in phase and will be fully implemented in Year 2009.

Pollution Prevention and Energy Efficiency (P2E2)

(<http://www.buyusa.gov/hongkong/en/p2e2.html>)

The Pollution Prevention and Energy Efficiency (P2E2) environmental financing program is based on a five-year-old cooperative framework agreement between the U.S. Environmental Protection Agency and the State Environmental Protection Administration of the People's Republic of China. P2E2 is a regular, non-controversial part of the agenda of each year's Joint Commission on Commerce and Trade (JCCT) between the U.S. and Mainland China. As a result of a USEPA-SEPA September 2005 workshop in Beijing on pollution in the Mainland Chinese cement industry that was organized by former SEPA's Deputy Director General LUO Gai Lai, SEPA's report on that event characterized P2E2 as "an attractive model for Chinese companies".

The P2E2 environmental financing program uses Hong Kong's legal and financial systems to mobilize private sector capital, management and technology from the US, Mainland China and elsewhere to provide solutions for Mainland China's growing energy conservation and air, water and ground pollution problems. P2E2 is a form of creative financing and public-private partnership that requires little or no public sector budgetary support to be effective.

P2E2 uses Asian Development Bank (ADB) or International Finance Corporation (IFC) loan guarantees (partial risk guarantees) and US Export-Import Bank export credits and

guarantees to enable Hong Kong commercial banks to make working capital loans, equipment leases and trade finance available to Hong Kong-based Environmental and Energy Service Companies (EESCO's). These EESCO's, in turn, carry out P2E2 technology and equipment upgrade work on factories, power plants and real estate developments in Mainland China under performance contracts signed with Hong Kong corporate parents of energy-wasting, polluting Chinese facilities, or with Hong Kong subsidiaries of Mainland Chinese owners of energy-wasting, polluting Chinese facilities. The P2E2 model may be used by an EESCO to do P2E2 work in any Asian developing country, provided a Hong Kong legal, financial and engineering platform is used.

When applied in the power generation sector, P2E2 generates emissions credits, either under the current Clean Development Mechanism of the Kyoto Protocol, or under any emissions trading regimes which may come about under the Asia Pacific Partnership for Clean Development and Climate (which includes Australia, Mainland China, India, Japan, Korea and the United States). Some of the other industrial sectors in which the P2E2 model may be applied are: aluminum, breweries, brickmaking, cement, chemicals, electronics, food processing, iron and steel, metalworking, paper and pulp, plastics, real estate development, and textiles.

Private sector reactions to the P2E2 model have been uniformly favorable. P2E2 has the support of the American Chamber of Commerce in Hong Kong, the Federation of Hong Kong Industries and the Hong Kong Institution of Engineers. Nine Hong Kong commercial banks are interested in supporting the P2E2 program: Bank of China (Hong Kong) Limited, Bank of East Asia, Citic Ka Wah Bank, Dah Sing Bank, DBS (Development Bank of Singapore), Hang Seng Bank, HSBC, Standard Chartered Bank, and United Commercial Bank. Two investment funds support the P2E2 program: ITM Ventures in Hong Kong and FE Clean Energy in Singapore and Darien, Connecticut.

Citic Ka Wah Bank is the first Mainland Chinese bank in Hong Kong to apply for a Master Guarantee Agreement with the US Export-Import Bank. It intends to market the P2E2 approach to its end user customers in the textiles, electronics, paper and pulp, and other manufacturing sectors. (<http://www.buyusa.gov/hongkong/en/p2e2.html>)

The primary benefits of the model are that:

- There is no upfront extra capital cost to end-users for P2E2 technology upgrades, making them very willing to accept the P2E2 program, as the program will be financed by Asia Development Bank (ADB), International Finance Corporation and/or US Export – Import Bank.
- There is an outsourcing of needed know-how by the end-user to an EESCO for environmental compliance and energy conservation;
- Technology upgrades will allow the end-user to increase production;
- Corporate reputation, for all parties involved, will significantly increase due to the environmental protection work conducted; and
- The P2E2 work will be conducted in China but the parties will be paid in Hong Kong. The Hong Kong legal and financial system will be utilized under the arrangement.

Mandatory use of ULSD in industrial and commercial processes

(<http://www.legco.gov.hk/yr07-08/english/panels/ea/papers/eacb1-2176-1-e.pdf>)

The Air Pollution Control (Fuel Restriction) (Amendment) Regulation has been announced at the Legislative Council on 21 May 2008, which is to mandate the use of ULSD in industrial and commercial processes. It will reduce about 2,480 tonnes of SO₂ emission per year, or about 3.4% of the total local SO₂ emission in 2006. The legislative procedure has been completed and the regulation is effect since 1 October 2008.

Encourage to adopt cleaner production technologies and processes

In November 2006, with the support of key industry associations, EPD commissioned the Hong Kong Productivity Council to conduct a Cleaner Production Technical Support Pilot Project. The objective was to speed up the adoption of cleaner production and support voluntary efforts by Hong Kong-owned factories in the PRD region. In August 2007, the governments of the HKSAR and Guangdong Province signed a co-operation agreement to further strengthen efforts in promoting energy efficiency, cleaner production and utilisation of resources among enterprises in Hong Kong and Guangdong. The Finance Committee of the Legislative Council approved the funding allocation of \$93 million in January 2008 to take the programme forward. The five-year programme will give professional and technical support to Hong Kong-owned factories in the PRD Region.

C1.1.3.6 Urban Planning and Conservation

Hong Kong Planning Standards and Guidelines

The Hong Kong Planning Standards and Guidelines (HKPSG) (http://www.pland.gov.hk/tech_doc/hkpsg/index_e.html) is a Government manual of criteria for determining the scale, location and site requirements of various land uses and facilities. It provides general guidelines to ensure that, during the planning process, the Government will reserve adequate land to facilitate social and economic development and provide appropriate public facilities to meet the needs of the public. The Chapter 9 on Environment of the HKPSG provides guidance for including environmental considerations in the planning of both public and private developments. Air quality is an area of concern in land use planning and current requirement stated that the Air Quality Objectives must be satisfied at the air sensitive receivers in urban planning. Adequate buffer distances should be allowed for pollution sources such as highway and industrial area. Although the standards and guidelines are not statutory, the planning permission system under the Town Planning Ordinance will give due regard to relevant environmental considerations in the planning and development process.

Air Ventilation Assessment: The HKSAR Government's First Sustainable Development Strategy (www.susdev.org.hk/archive/archive/en/pdf/1stSDStrategyE.pdf) promulgated in May 2005 has identified the target to maintain and review guidelines governing sustainable urban planning and design, with special regard to issues such as buildings affecting view corridors or restricting air flow. A set of qualitative guidelines and a framework for carrying out air ventilation assessment have been formulated and listed in Chapter 11 of the HKPSG, to strengthen the urban design guidelines for better air ventilation. The HKPSG guidelines on air ventilation are applicable to major Government projects and will assist the planning process in plan preparation at the macro level. Proponents of private projects are encouraged to use the guidelines in formulating planning and design proposals on a voluntary basis.

Sustainability Assessment

The Council for Sustainable Development recommended that Sustainability Assessment (SA) should be conducted and sustainability principles integrated into the Government decision-making process. It provides a structured framework for bureaux and departments to identify the sustainability implications associated with a proposal, compare different strategic or policy options, and scope out cross-section or sensitive issues for early attention or joint department examination. Guiding principles of SA are: Hong Kong should be pro-active in avoiding environmental problems for present and future generations, seek to find opportunities to enhance environmental quality, and minimize the unwanted side effects, locally, nationally and internationally, of development and inefficiencies such as air, noise and water pollution or land contamination. Index for criteria air pollutants based on percentage of the Air Quality Objectives should be evaluated in the SA.

Hong Kong 2030

(http://www.pland.gov.hk/p_study/comp_s/hk2030/eng/home/index.htm)

The Study on Hong Kong 2030 Planning Vision and Strategy (HK2030 Study) is a comprehensive review of Hong Kong's territorial development strategy, aiming to formulate a

broad planning framework to guide the future development of Hong Kong up to year 2030. The study results were announced in October 2007. As its overarching goal, the HK2030 Study aims to adhere to the principles of sustainable development to balance social, economic and environmental needs. It recommends that our future spatial development pattern should adopt the planning concept of prudent use of land resources by planning for more development around mass transit railway stations to facilitate fast and mass movement of people in an environmentally-friendly mode of transport. The recommended rail-based development pattern will reduce reliance on the use of private cars and curb carbon emissions, thus contributing to our efforts in the fight against global warming. A Strategic Environmental Assessment (SEA) was carried out as part of the HK2030 Study. In terms of air quality, it was estimated that there would be general improvement in the medium to long term. More details could be found in the SEA report contained in the HK2030 Study web site above.

Energy Efficiency Scheme

The Government has been operating a voluntary energy efficiency-labelling scheme (http://www.emsd.gov.hk/emsd/eng/pee/eels_pub1.shtml) for 17 types of household and office appliances and vehicles, so consumers can take energy performance into consideration when making purchases. It requires local manufacturers and importers to display energy efficiency labels on all air-conditioners, refrigerators and compact fluorescent lamps (account for 70% electricity consumption in residential sector, or 150 GWh per year) at point of purchase.

The government has introduced a mandatory Energy Efficiency Labelling Scheme (EELS) through the Energy Efficiency (Labelling of Products) Ordinance Cap.598 published in the Gazette on 9 May 2008 (<http://www.gov.hk/en/residents/environment/energy/mandatorylabel.htm>). The three types of prescribed products covered in the first phase of the mandatory EELS are room air conditioners, refrigerating appliances and compact fluorescent lamps. Under the Ordinance, a prescribed product being supplied by a manufacturer or importer shall be a listed model having a reference number assigned in his name by the Electrical & Mechanical Services Department and bears an energy label that complies with the specified requirement. A person who is not a manufacturer or importer of a prescribed product, for example a retailer or wholesaler, shall ensure that a prescribed product being supplied by him/her is a listed model with a reference number and bears an energy label.

There is a grace period of 18 months after gazetting of the Ordinance. Thus, it is possible that not all models of the 3 prescribed products bear energy labels during the grace period. It is expected that more and more product models with energy label will be put on the market over time. Starting from 9 November 2009, all prescribed products are required to be supplied with energy labels in Hong Kong.

Hong Kong Energy Efficiency Registration Scheme for Buildings

(<http://www.emsd.gov.hk/emsd/eng/pee/eersb.shtml>)

This Scheme promotes the minimum energy performance standards (MEPS) of installations, covering lighting, air conditioning, electrical and lift & escalator, via the Building Energy Codes (BEC). Adoption of the BEC, however, is at the discretion of the designer. A registration certificate will be issued to a building that meets the individual BEC standards. Registered building can use the 'Energy Efficient Building Logo' to publicize the achievement on energy efficiency. Up to May 2008, 2070 registration certificates were issued to 840 building venues involving 2265 installations.

The objectives of BEC are to facilitate efficient use of energy in buildings and to promote innovative approaches to achieve optimum building energy performance. It provides the criteria and the minimum standards for energy efficiency in the design or retrofit of buildings and describes the methods for determining compliance. It also intends to encourage energy efficient designs and good practices that exceed these criteria and minimum standards.

On 28 December 2007, the administration launched a three-month public consultation on a proposal to introduce mandatory implementation of the BEC for certain new and existing buildings, with a view to improving energy efficiency of buildings, alleviating global warming and combating air pollution. The vast majority of the views received in the consultation supported the implementation of the proposal. A report on the results of the consultation exercise has been prepared.

Given the general support from the public and various stakeholders and taking into account of the comments received, the legislative proposal for the mandatory implementation of the BEC is being prepared, with a view to introducing the legislation into the Legislative Council in 2009.

Energy Conservation Charter 2006 – Suitable Room Temperature

The aim of the Charter (http://www.energyland.emsd.gov.hk/blue_sky/eng/index.htm) is to encourage participating groups to save energy in their daily lives and adhere to the principle of "use if required, save if possible". Groups signing the Chapter pledge to do their best to reduce the use of air-conditioning and save energy. Clear guidelines and plans on energy saving are developed by senior management to ensure that staff will adjust the air-conditioning setting to the most suitable temperature to avoid wastage of energy. Energy efficient ventilation equipment, like fans, could be used together with air-conditioners. Casual and smart dress in summer is encouraged. The ideal room temperature of air-conditioned space in summer months is recommended to be 25.5°C.

Stakeholder Voluntary Measures

The business community has taken the initiative to improve air quality in Hong Kong and PRD. The Clean Air Charter (<http://www.cleanair.hk/eng/charter.htm>), which encourages business community's involvement on a best effort basis, has been established in 2005. The participation of the Clean Air Charter is voluntary. To combat air pollution and improve air quality of the PRD, the Charter encourages the implementation of an energy and emission reduction programme incorporated into daily business operations. It lists six key areas in which businesses can contribute to reduce air pollution. In July 2007, about 610 companies have signed up on the Charter.

C1.1.3.7 Regional Collaboration

PRD Regional Air Quality Management Plan

(http://www.epd.gov.hk/epd/english/action_blue_sky/files/Annex08eng.pdf)

The Hong Kong and Guangdong Governments have set up the Hong Kong-Guangdong Joint Working Group on Sustainable Development and Environmental Protection in June 2000 to work co-operatively on environmental and sustainability issues.

On December 2003, the 4th Joint Working Group meeting approved the PRD Regional Air Quality Management Plan. Both sides agreed to control pollution emissions of power plants, motor vehicles, industrial processes, and products containing volatile organic compounds to achieve the 2010 Reduction Targets.

The 7th Joint Working Group meeting was held on December 2006. Implementation progress of PRD Regional Air Quality Management Plan was discussed. The Implementation Framework of the Emission Trading Pilot Scheme for Thermal Power Plants in the PRD Region was endorsed in the 7th meeting.

The 9th Joint Working Group meeting was held on December 2008. Implementation progress of environmental co-operation initiatives was reviewed. The meeting noted that both sides have proactively implemented the PRD Regional Air Quality Management Plan in the past year, and released the Mid-term Review report of the Management Plan. Additional enhanced measures have been adopted by taking into account the recommendations of the report. The two governments are committed to achieve the 2010 emission reduction targets. To better inform the public about regional air quality, the two sides jointly released the

results of the PRD Regional Air Quality Monitoring Network for 2007 and the first half of 2008 in April and October 2008 respectively. (http://big5.southcn.com/gate/big5/www.pprd.org.cn/hkenglish/whatsnew/200812/t20081219_53361.htm)

Joint Cooperation Between HKSAR and GD Provincial Government

Since 2000 the Hong Kong and Guangdong Governments have set up the Hong Kong-Guangdong Joint Working Group on Sustainable Development and Environment Protection. As part of their work, the PRD (Pearl River Delta) Regional Air Quality Management Plan was established where both Hong Kong and Guangdong agreed to control pollution emissions of power plants, motor vehicles, industrial processes and products containing VOCs. (http://www.epd.gov.hk/epd/english/action_blue_sky/files/Annex08eng.pdf) The functions of the Joint Working Group include:

- Assess the progress of the regional air quality management plan;
- Establish regional air quality monitoring network;
- Establish regional emissions inventory;
- Enhance technical exchanges and training of personnel;
- Report emissions trading pilot scheme for thermal power plants in the PRD Region; and
- Follow-up on the mid-term review of the regional air quality management plan.

Figure C1.1 illustrates the organisational structure of the Joint Working Group.

Figure C1.1: Hong Kong – Guangdong joint working group organization structure



Since 30 November 2005, the Regional Air Quality Monitoring Network jointly established under the Management Plan had been formally commissioned and the PRD Regional Air Quality Index published on a daily basis. The enhanced control measures under the Management Plan were well on schedule. Moreover, the two sides exchanged ideas and know-how on air quality monitoring, air emissions inventory compilation, preventive measures on vehicles emissions and continuous emissions monitoring of stationary pollution sources.

The JWG have agreed to include additional measures in the Management Plan. They include introducing emission caps for power plants in Hong Kong, tightening control over pollutant emissions from major pollution sources in the PRD, studying the feasibility of advancing the implementation of more stringent motor vehicle emission standards in Mainland cities, and stepping up regular inspection of in-use motor vehicles. The two governments will also strengthen exchanges and co-operation on continuous emissions monitoring of stationary pollution sources and enhance the reliability of the systems on both sides and the comparability of data.

C1.2 Current PRD Air Quality Policies

C1.2.1 Management Framework

The overall objectives of the legislation in Mainland are for the purpose of preventing and controlling atmospheric pollution, protecting and improving people's environment and the ecological environment, safeguarding human health, and promoting the sustainable development of economy and society.

The State Council (国务院) and the local people's governments at various levels must incorporate the protection of the atmospheric environment into their national economic and social development plans, make rational plans for the distribution of industrial layout, strengthen the scientific research on the prevention and control of atmospheric pollution, adopt preventive and curative measures against atmospheric pollution, and protect and improve the atmospheric environment. The State takes measures to control or gradually reduce, in a planned way, the total amount of the main atmospheric pollutants discharged in local areas.

The local people's governments at various levels shall be responsible for the quality of the atmospheric environment under their own jurisdictions, making plans and taking measures to make the quality of the atmospheric environment under their own jurisdictions meet the prescribed standard. The administrative department of environmental protections under the people's governments at or above the county level shall be the instrument conducting unified supervision and management of the prevention and control of atmospheric pollution.

The administrative departments of public security, transportation, railways and fishery at various levels shall, by performing their respective functions, conduct supervision and management of the atmospheric pollution caused by motor-driven vehicles and vessels.

C1.2.1.1 State Environmental Protection Administration (国家环境保护总局)

The State Environmental Protection Administration (SEPA) (<http://www.zhb.gov.cn/>) is responsible for formulating national legislation, policies and standards against air pollution; and setting strategies to improve the atmospheric environment for the state. It guides provincial environmental departments on air pollution issues.

SEPA will also prepare control plan every 5 years on the overall environmental control strategy. Environmental goals in the 5-year plans provided impetus for forced shutdown or relocation of urban factories, funding for installation of more advanced treatment, and justification for a raft of environmental laws and regulations.

Department of Planning and Finance (规划与财务司): (http://www.zhb.gov.cn/dept/jgzn/gszn/200301/t20030127_84358.htm) responsible for formulation of national environmental protection plans and control, including rules and regulations on air management.

Department of Policies, Laws and Regulations (政策法规司): (http://www.zhb.gov.cn/dept/jgzn/gszn/200301/t20030127_84359.htm) responsible for setting up national environmental strategy, policies, laws and regulations.

Department of Pollution Control (污染防治司): (http://www.zhb.gov.cn/dept/jgzn/gszn/200810/t20081031_130727.htm) formulates and organizes the implementation of laws, regulations and rules on pollution prevention for air.

C1.2.1.2 Provincial and Municipality Environmental Protection Bureaux (省环境保护局)

The SEPA takes measures to control or gradually reduce, the total amount of the main atmospheric pollutants discharged in a planned manner. The Provincial and Municipality Environmental Protection Bureaux (PAMEPB) shall be responsible for the quality of the atmospheric environment under their own jurisdictions, making plans and taking measures to make the air quality meeting the prescribed standard. The PAMEPB are also the instrument conducting unified supervision, monitoring and management of the prevention and control of atmospheric pollution. Under the PAMEPB, there are planning section, audit section, monitoring section, technology development section, PRD centralised control section and pollution control section.

For the Guangdong Province as an example (<http://www.gdepb.gov.cn/>), Provincial Environmental Protection Law for Guangdong (广东省环境保护条例 (省级地方性法规)) has been formulated for the air pollution control. Whereas, for the Shenzhen Municipal, Shenzhen Environmental Protection Law (深圳经济特区环境保护条例 (经济特区法规)) has also been stipulated. The Municipal level shall be reported to the Provincial level, while the Provincial level shall be reported to the State level.

C1.2.2 Legislation Policies

C1.2.2.1 General Emission Control

Ambient Air Quality Standard (环境空气质量标准) (GB 3095 - 1996): (<http://www.eptime.cn/fagui/311.htm>) classify Air Quality Standard into three categories; namely: natural/ scientific protection zone; residential/ commercial/ general industrial zone; and special industrial zone. Criteria and averaging time limit for 6 pollutants are specified, including sulphur dioxide (SO₂), Total suspended particulate (TSP), nitrogen oxides (NO_x), carbon monoxide (CO), ozone (O₃), lead (Pb), benzo[a]pyrene (B[a]P) and fluoride (F). The standard came into effective from 1 Oct 1996.

Integrated Emission Standard of Air Pollutants (大气污染物综合排放标准) (GB 16297 - 1996): (<http://www.jxepb.gov.cn/Hjzbz/air/GB16297-1996.htm>) limits the emission standards of 33 air pollutants and stipulates criteria during operations which commences since 1 Jan 1997.

Air Pollution Control in Pearl River Delta of Guangdong Province (广东省珠江三角洲大气污染防治办法(粤府令第 134 号)): Announced on February 27, 2008 in the Guangdong Provincial People's Government Eleventh 27th executive meeting, the legislation will be in force since May 1, 2009. It was established to improve the air quality in Pearl River Delta of Guangdong Province, and to prevent regional and combination air pollution in this area.

(http://www.gd.gov.cn/govpub/zfwj/zfxxgk/gz/200903/t20090330_88639.htm)

C1.2.2.2 Energy Utility (<http://www.mep.gov.cn/tech/hjzbz/bzwb/dqhjbh/>)

Emission Standard for Pollutants from Coke Oven (炼焦炉大气污染物排放标准) (GB 9078 - 1996): regulates the air pollutants emissions from coke oven with effect from 1 Jan 1997.

Emission Standard for Pollutants from Coal industry (煤炭工业污染物排放标准) (GB 20426 - 2006): regulates the air pollutants emissions from coal industry with effect from 1 October 2006.

Emission Standard of air pollutants for Thermal Power Plants (火电厂大气污染物排放标准) (GB 13223 - 2003): provides the emission limits of air pollutants from thermal power plants at different target stages with effect from 1 Jan 2004.

C1.2.2.3 Motor Vehicle Emissions (<http://www.mep.gov.cn/tech/hjbz/bzwb/dqjhjbh/>)On-road vehicle

Hazardous materials control standard for motor vehicle gasoline (轻型汽车污染物排放限值及测量方法 (II)) (GWKB 1-1999): issued on 1 Jan 2000, for control on the content of lead and benzene in the fuel mix for motor vehicle gasoline.

Control emissions from light-duty vehicles (II) (轻型汽车污染物排放限值及测量方法 (中国 III、IV II? 阶段) (GB 18352.2 - 2001): limits the emission standards for light-duty vehicles (II) with effect from Jul 2004.

Control emissions from light-duty vehicles (III, IV) (轻型汽车污染物排放限值及测量方法 III、IV) (GB 18352.3 - 2005): limits the emission standards for light-duty vehicles (III, IV) with effect from Jul 2007

Control emissions from exhaust from diesel engines of tri-wheel & low-speed goods vehicles (三轮汽车和低速货车用柴油机排气污染物排放限值及测量方法) (GB 19756 - 2005): limits the emission standards for diesel engines of tri-wheel & low-speed goods vehicles. This standard has been put into action since 1 Jan 2006.

Control emissions from exhaust from motorcycles and mopeds (摩托车和轻便摩托车排气烟度排放限值及测量方法) (GB 19758 - 2005): limits the exhaust smoke emissions from motorcycles and mopeds with effect from 1 Jul 2005.

Control emissions from exhaust emissions from motorcycles and mopeds at idle speed (摩托车和轻便摩托车排气污染物排放限值及测量方法 (怠速法)) (GB 14621 - 2002): limits the idling emission from motorcycles and moped with effect from 1 Jan 2003.

Control emissions from exhaust emissions from motorcycles at running mode (摩托车排气污染物排放限值及测量方法 (工况法)) (GB 14622 - 2002): limits the running emission from motorcycles with effect from 1 Jan 2003.

Control emissions for exhaust pollutants from positive ignition (PI) engines of vehicles and vehicles equipped with PI engines (车用点燃式发动机及装用点燃式发动机汽车排气污染物排放限值及测量方法) (GB 14762 - 2002): limits the emission from positive ignition engine with effect from 1 Jan 2003.

Control emissions for exhaust emissions from mopeds under running mode (轻便摩托车排气污染物排放限值及测量方法 (工况法)) (GB 18176 - 2002): limits the running emission from motorcycles and moped with effect from 1 Jan 2003.

Control exhaust smoke from CIE (Compression Ignition Engine) and vehicle equipped with CIE (车用压燃式发动机和压燃式发动机汽车排气烟度排放限值及测量方法) (GB 3847 - 2005): limits the smoke emission from CIE with effect from 1 Jul 2005.

Control crankcase pollutants from heavy-duty vehicles equipped with PI engines (装用点燃式发动机重型汽车曲轴箱污染物排放限值) (GB 11340 - 2005): limits the emission from heavy-duty vehicles equipped with P.I. engine with effect from 1 Jul 2005.

Control exhaust pollutants from positive ignition (PI) engines of vehicles and vehicles equipped with PI engines (车用点燃式发动机及装用点燃式发动机汽车排气污染物排放限值及测量方法) (GB 14762 - 2002): limits the emission from P.I. engine of vehicles with effect from 1 Jan 2003.

Control fuel evaporative Pollutants from heavy-duty vehicles equipped with PI engines (装用点燃式发动机重型汽车燃油蒸发污染物排放限值) (GB 14763 - 2005): limits the fuel evaporating emission from P.I. engine of vehicles with effect from 1 Jul 2005.

Control exhaust pollutants from compression ignition and gas fuelled positive ignition engines of vehicles (III, IV, V) (车用压燃式、气体燃料点燃式发动机与汽车排气污染物排放限值及测量方法 (中国 III、IV、V 阶段)) (GB 17691 - 2005): limits the exhaust emission from compression ignition and gas fuelled positive ignition engine of vehicles with effect from 1 Jan 2007.

Control exhaust pollutants from vehicles equipped with ignition engine under two-speed idle conditions and simple driving mode condition (点燃式发动机汽车排气污染物排放限值及测量方法 (双怠速法及简易工况法)) (GB 18285-2005): limits the exhaust emission from equipped ignition engine under two-speed idle conditions and simple driving mode with effect from 1 Jan 2007.

Limits and measurement methods for evaporative pollutants from motorcycles and mopeds (摩托车和轻便摩托车排气烟度排放限值及测量方法) (GB 20998-2007): specified the limits and measurement methods for evaporative pollutants from motorcycles and mopeds. It also specifies the approval requirements, consistency check and identification methods for the emission type of evaporative pollutants from motorcycles and mopeds. The current Standard is applicable to motorcycles and mopeds with gasoline as their fuel.

Limits and measurement methods for emissions of pollutants from mopeds on the running mode (CHINA stage III) (轻便摩托车污染物排放限值及测量方法(工况法, 中国第三阶段)) (GB18176-2007): specified the limits and measurement methods for emissions of pollutants from mopeds on the running mode, emission requirements for the pollutants from the crankcase and durability of pollution control devices.

Limits and measurement methods for the emissions of pollutants from motorcycles on the running mode (CHINA stage III) (摩托车污染物排放限值及测量方法(工况法, 中国第三阶段)) (GB 14622-2007): specified the limits and measurement methods for the emissions of pollutants from motorcycles on the running mode, crankcase emission requirement and durability requirements for pollution control devices.

Off-road Vehicle

Control smoke emissions for free acceleration from agricultural vehicles (轻型汽车污染物排放限值及测量方法 (I)) (GB 18352.1 -2001): limits the smoke emission from agricultural vehicles with effect from 1 Jul 2002.

Control the exhaust pollutants from diesel engines of non-road mobile machinery (I, II) (非道路移动机械用柴油机排气污染物排放限值及测量方法(中国 I、II 阶段)) (GB 20891-2007): limits the emission from diesel engines of non-road mobile machinery with effect from 1 Oct 2007.

C1.2.2.4 Production Industry

Emission Standard of Air Pollutants for Coal-Burning Oil-Burning Gas-Fired Boiler (锅炉大气污染物排放标准) (GB 13271 – 2001): states the maximum emissions of various exhausts from the coal burning/oil burning/gas fired boilers with effect from 1 Jan 2002.

Emission Standard of Air Pollutants for Industrial Kiln and Furnace (工业炉窑大气污染物排放标准) (GB 9078 – 2001): states the maximum emissions of various exhausts from industrial kiln and furnace with effect from 1 Jan 1997.

Emission Standard of Air Pollutants for Cement Industry (水泥工业大气污染物排放标准) (GB 4915 – 2004): stated the maximum emissions of various exhausts from cement industry with effect from 1 Jan 2005.

Emission Standard of Air Pollutants for Oil Storage Facility (储油库大气污染物排放标准) (GB 20950 – 2007): stated the maximum emissions from oil storage facility with effect from 1 Aug 2007.

Emission Standard of Air Pollutants for Transportation of Gasoline/Petrol (汽油运输大气污染物排放标准) (GB 20951 – 2007): stated the maximum emissions from transportation of gasoline/ petrol with effect from Aug 2007.

Emission Standard of Air Pollutants for Gasoline/Petrol Filling Station (加油站大气污染物排放标准) (GB 20952 – 2007): stated the maximum emissions from gasoline/petrol filling station with effect from 1 Aug 2007.

Technical Guidance for the Development of Clean Production Standard (清洁生产标准制订技术导则) (HJ/T 425-2008): specified such contents as the framework structure, principle, rules and work procedures, contents, methods and format for the development of sector clean production standards

Clean Production Standard--Iron & Steel Industry (Sintering) (清洁生产标准钢铁行业(烧结)) (HJ/T 426-2008): is applicable to the clean production examination; judgment of the potential and opportunity of clean production; assessment & publication system of the performance of clean production of the enterprises with sintering production process in iron & steel industry. It is also applicable to environmental management systems such as EIA and pollution discharge license.

Clean Production Standard--Iron & Steel Industry (Blast furnace iron smelting) (清洁生产标准钢铁行业(高炉炼铁)) (HJ/T 427-2008): is applicable to the clean production examination; judgment of the potential and opportunity of clean production; assessment & publication system of the performance of clean production of the enterprises with blast furnace iron smelting production process in iron & steel industry. It is also applicable to environmental management systems such as EIA and pollution discharge license.

Clean Production Standard--Iron & Steel Industry (Steel Smelting) (清洁生产标准钢铁行业(炼钢)) (HJ/T 428-2008): is applicable to the clean production examination; judgment of the potential and opportunity of clean production; assessment & publication system of the performance of clean production of the enterprises with steel smelting production process in iron & steel industry. It is also applicable to environmental management systems such as EIA and pollution discharge license.

Clean Production Standard--Chemical Fiber Industry (Polyester Fibre) (清潔生產標準化纖行業(滌綸)) (HJ/T 428-2008) (HJ/T 429-2008): is applicable to the clean production examination; judgment of the potential and opportunity of clean production; assessment & publication system of the performance of clean production of the enterprises that employ p-Phthalic acid direct esterifying method to produce polyester and manufacture terylene fiber with polyester as raw materials. It is also applicable to environmental management systems such as EIA and pollution discharge license.

Clean Production Standard--Calcium Carbide Industry (清潔生產標準電石行業(滌綸)) (HJ/T 428-2008) (HJ/T 429-2008) (HJ/T 430-2008): is applicable to the clean production examination; judgment of the potential and opportunity of clean production; assessment & publication system of the performance of clean production of the enterprises in calcium carbide industry. It is also applicable to environmental management systems such as EIA and pollution discharge license.

Technical Requirement for Environmental Labeling Products Aerosol insecticide (環境標誌產品技術要求殺蟲氣霧劑) (HJ/T 423-2008): stipulates the limit on product toxicity, benzene series and the VOC of various types of products of aerosol insecticides.

Emission Standard of Pollutants for Electroplating (电镀污染物排放标准) (GB 21900--2008): specified the discharge limit for electroplating water pollutant and air pollutant emission limit of electroplating enterprises and enterprises with electroplating facilities.

Emission Standard of Pollutants for Synthetic Leather and Artificial Leather Industry (合成革与人造革工业污染物排放标准) (GB 21902--2008): specified the special production process and the limits for waste water and air pollutants of synthetic feather and artificial enterprises.

C1.2.3 Policies and Programmes

The China's National People's Congress (全國人民代表大會) passed new legislations authorizing amendments of concentration based emission regulations to mass based emission regulation in April 2000. It required the local environmental authorities to limit the total air pollutant emissions in a given air-shed by issuing emission permits and collecting fees

based on the mass of pollutant emitted by an enterprise. The new legislation encourages use of low emission materials, such as low-sulphur and low-ash coal.

C1.2.3.1 Forward Plan

Overall Control Target under the Hong Kong – Guangdong JWG

Under the Hong Kong – Guangdong JWG, the Guangdong government targeted to reduce four major air pollutants, sulphur dioxide (SO₂), nitrogen oxides (NO_x), Respirable Suspended Particulates (PM₁₀) and volatile organic compounds (VOC), in the PRD Region by Year 2010, using Year 1997 as the base year. The Year 2010 reduction targets are shown in **Table C1.6** below.

Table C1.6: Year 2010 reduction targets for PRD^[1]

Pollutant	Emission Level in Year 1997 (PRD) (tonnes)	Reduction Target for Year 2010 (tonnes)
SO ₂	798,300	-40%
NO _x	756,200	-20%
PM ₁₀	530,900	-55%
VOC	469,800	-55%

Note:

^[1] Source: The Mid-term Review report of the Management Plan, December 2007.
(www.epd.gov.hk/epd/tc_chi/action_blue_sky/files/mid-term_review_report_sc.pdf)

In Year 2006, the major tasks under the Management Plan approved by the JWG include the following actions:

- (a) On combating air pollution from the power generation industry, Phase I construction of the liquefied natural gas (LNG) trunk pipeline in Guangdong Province will be completed in Year 2006 and a number of LNG power plants are expected to be commissioned in phases. This will substantially reduce the PRD's reliance on the more polluting fuel oil and coal. Moreover, existing oil-fired and coal-fired power plants in Guangdong Province will continue to install flue gas desulphurization systems;
- (b) On controlling emissions from motor vehicles, the Guangdong Provincial Government will strive to advance the implementation of National III motor vehicle emission standards (on par with Euro III standards) in PRD cities while Hong Kong will implement Euro IV motor vehicle emission standards in line with the EU in Year 2006;
- (c) The data collected by the Regional Air Quality Monitoring Network will be analysed by the environmental protection authorities of the two governments. A regional air quality monitoring report will be submitted on a half-year basis, providing the public with more information on the air quality in the PRD region;
- (d) The environmental protection authorities of the two governments will continue to strengthen technical exchanges and joint studies, especially on continuous emissions monitoring of stationary pollution sources and commissioning studies on regional air pollution on a need basis; and
- (e) Implementation framework of the Emission Trading Pilot Scheme for Thermal Power Plants in the PRD Region was announced in January 2007. This platform will allow power plants in both places to identify cost effective reduction on a voluntary basis.

In order to enhance the channel to exchange information, technical exchange sections have been organised, including:

- (a) Operation of the regional monitoring network and compilation of emissions inventories;
- (b) Studying the feasibility of adopting National IV/V motor vehicle emission standards in the PRD Economic Zone in Year 2010;

- (c) In-use vehicles emissions inspection technologies and management;
- (d) Continuous emissions monitoring systems for stationary pollution sources;
- (e) Flue gas de-NO_x technology for thermal power plants; and
- (f) Emissions reduction technology for industrial pollution sources.

Other Proposals:

Under the Guangdong Province Environmental Protection and Ecological Construction Eleventh Five-year Plan (广东省环境保护与生态建设“十一五”规划) (http://www.gd.gov.cn/govpub/fzgh/zd zx/200706/t20070605_16778.htm), the objectives of the air pollution control in PRD are:

- Strengthen the control at the source of pollution;
- Adopt effective control measures to reduce the emission / discharge of pollutants; and
- Control the emission of SO₂ from coal-fired power plants.

Energy (HTTP://WWW.GD.GOV.CN/GOVPUB/FZGH/ZDZX/200706/T20070605_16778.HTM)

USE OF CLEAN FUEL AND POLLUTION REDUCTION FACILITIES

The Guangdong Provincial Government controls the use of high sulphur fuel. The sulphur content of coal and fuel oil should be below 0.8% in the acid rain control zone. Small-scale thermal power generating units is being phased out.

Flue gas desulphurization systems are scheduled to be installed in a number of power plants, namely Shajiao Power Plant A (Unit 5), Shenzhen Xibu Power Plant (Units 4, 5 and 6), Guangzhou Hengyun Power Plant, Guangzhou Ruiming Power Plant, Guangzhou Power Plant, Yuancun Thermal Power Plant Boiler 2, Guangzhou. Papermaking self-use thermal plant and Taishan Power Plant Units 1 and 2.

The control scheme was extended to cover all oil-fired and coal-fired generation units of capacity above 125MW, which are required to install flue gas desulphurization systems by Year 2007. The scheme also requires all coal-fired and oil-fired power plants to adopt low-NO_x combustion technologies in case of alteration or expansion.

The Guangdong Provincial Government is working progressively to reduce the energy consumption per 10000 Yuan GDP. The aim is to establish a diverse energy production and supply system, which is safe, stable, economical, efficient and clean, by Year 2010.

Coal combustion technologies in China are under review and various emission control technologies have been investigated. Simultaneous SO₂/NO_x removal processes, including wet flue gas desulphurization (FGD), semi-dry FGD, dry fluidized FGD, low NO_x burner and selective catalytic reduction (SCR), are the technology trends for coal-fired power plant.

USE OF CLEANER ENERGY

The Guangdong Provincial Government is constructing liquefied natural gas (LNG) trunk pipeline and the associated works. The Phase I work, capable of delivering 3 Mt/year, has been completed in 2006. The Phase 2 work is scheduled to be completed in Year 2009, and the total capacity will be increased to 6 Mt/year. A number of new LNG power plants, including four LNG power plants at Daya Bay in Huizhou, Shenzhen East, Qianwan in Shenzhen and Zhujiang in Guangzhou, will also be constructed. To facilitate power transmission from western provinces, a 500KV dual circuit annular core transmission grid will be developed. The “Technical Note on Control Technology Trend” presents more details on the technology development in usage of cleaner energy.

EMISSION TRADING

Emission Trading Pilot Scheme for Thermal Power Plants in the PRD Region (the “Pilot Scheme”) has been proposed in Year 2007. Implementation framework of the Pilot Scheme

have been developed in Jan 2007. The plan will be introduced to the power plants in Guangdong and Hong Kong so that prospective participants can identify their trading partners and draw up emissions trading agreements.

REDUCE EMISSIONS FROM COAL-FIRED AND OIL-FIRED POWER STATIONS

(<http://zdkjzx.gdstc.gov.cn/ShowNewsDetails.do?newsId=478>)

(http://www.epd.gov.hk/epd/tc_chi/news_events/legco/files/Chi-Annex2-210108.pdf)

Close down small thermal power generating units

Power plants with a capacity equal or above 300MW 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 9660MW in the Province by the end of 2010, including those with a total capacity of about 7100MW in the PRD Economic Zone – about 1600MW to be closed down in 2007, 3600MW in 2008 and 1900MW in 2009.

Installation of flue gas denitrification systems

There is requirement for all coal-fired and oil-fired power plants under construction, alteration or expansion to install flue gas denitrification systems. The Guangdong Provincial Government is currently studying the feasibility of installing flue gas denitrification systems for existing power plants.

Concessions for desulphurization systems

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 extra RMB 1.5 cents per unit when the electricity is sold to the power grid.

(http://www.epd.gov.hk/epd/tc_chi/news_events/legco/files/Chi-Annex2-210108.pdf)

Province-wide quota administration system for emissions of sulphur dioxide

A province-wide quota administration system is established for total emissions of sulphur dioxide and to study the emissions trading mechanism for sulphur dioxide.

Enhance technological improvements of existing power plants

There are plans to enhance technological improvements of existing power plants and to implement cleaner production. Newly built power plants have to meet the higher standard for cleaner production.

Transport (http://www.gd.gov.cn/govpub/fzgh/zd zx/200611/t20061101_9228.htm)

ON-ROAD

Starting from Year 1983, China has published and revised standards of vehicle-emitted pollutants control, covering gasoline vehicles, diesel vehicles, engines, motorcycles and agricultural transport vehicles, etc. Comprehensive vehicle emission control standard system has been established gradually. National II emission standards have already been adopted since 1 July 2005. The tentative implementation schedule for vehicle emission standard is listed in **Table C1.7** below.

Table C1.7: Implementation schedule

Vehicle type	Light Duty Vehicle	Heavy Duty Vehicle
Euro I /National I	January 2002	September 2001
Euro II /National II	July 2005	September 2004
Euro III /National III	July 2008	January 2008

Vehicle type	Light Duty Vehicle	Heavy Duty Vehicle
Euro IV /National IV	July 2011	January 2011
Euro V /National V	No time table for implementation.	January 2013 (national-wise)

Since 2002, Guangdong Province has gradually tightened its motor diesel standards. Guangdong Province has already announced the local National III standard for motor fuel in August 2006. The sulphur content of motor diesel in Guangdong is limited to 0.2% by weight. Motor diesel with sulphur content below 0.035% has been supplied to Guangzhou since September 2006. The low sulphur fuel is marketed at all petrol filling stations in Shenzhen from April 2007. In addition, the fuel is available at more than 41 petrol filling stations in Guangzhou. The supply network is expected to cover the whole PRD Region.

Guangdong Provincial Government has also taken steps to require all new motor vehicles to comply with emission standards. Procedures have been formulated to step up annual inspection and on-road spot checks of in-use vehicles. Also, the control of in-use vehicles will be strengthened to ensure that over 90% of motor vehicles in the cities satisfy tailpipe emission standards.

With effect from 1 September 2006, all newly registered motor vehicles in Guangzhou are required to meet National III standards (on par with Euro III standards). Control actions against smoky motor vehicles have also been implemented. The feasibility of advancing the implementation of the National IV emission standards for light-duty vehicles and National V emission standards for heavy-duty vehicles by Year 2010 is being studied. Enhanced management on regular inspections of in-use motor vehicles has been carried out to ensure the required environmental performance could be met. Motorcycles are prohibited in certain road sections in the urban areas.

The Guangdong Environmental Protection Bureau is discussing with the State Council to implement the same emission standards in other PRD cities.

In Shenzhen, all newly registered public transport vehicles are required to comply with the National III emission standards. Reporting and joint investigation systems for smoky vehicles have also been established. In addition, inspection and maintenance (I/M) programme and labelling system on the environmental categorization of motor vehicles have been implemented. Motorcycles have been banned from travelling in the urban areas in Guangzhou and Dongguan since 1 January 2007 and 1 September 2007 respectively.

The Government has experimented 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. Starting from 1 January 2007, motor vehicles complying with the National III emission standard will be given the environmental label.

OFF-ROAD

Off-road mobile emission sources

There are two legislations in force to control off-road mobile emission sources. The control of smoke emissions for free acceleration from agricultural vehicles (GB 18352.1 -2001) has been enforced since 1 Jul 2002, while the trial period for the control of exhaust pollutants from diesel engines of non-road mobile machinery (I, II) (GB 20891-2007) started from 1 Oct 2007.

Navigation

Based on the latest 5-year plan, inland vessels and ocean-liners have not been identified as a major pollution sources, and there is no specific legislation in PRD that sets related emission standards. Nonetheless, there is new international maritime law on ocean-going liner emission control. The participating countries can propose their waters to be designated as a 'sulphur emission control area' (SECA), in which ships will be required to burn low-sulphur fuel (<1.5% S).

Civil Aviation

Most air pollution due to aviation is produced during landing and take-off, including climb-out, final approach, taxiing and ground-support equipment. Jet fuel in Mainland should comply with National Technology Supervising Bureau standard GB 6537 94. However, there is no specific legislation in PRD that sets emission standards for airplanes. The international trend is to enhance the efficiency of the engines of new aircraft types and to phase out the old ground support-equipment, which in turn will minimize the emission from international flights in the long run.

Production Industry

COMBUSTION

Guangdong Provincial Government has formulated plans to phase out small coal-fired boilers less than 2 tonnes/hour capacity, in build-up areas of cities by Year 2005. All large and medium-size industrial boilers are required to install desulphurization systems or adopt clean combustion technologies to reduce emissions. Location and planning of industries causing serious pollution on sensitive areas will be strictly determined and administered centrally.

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 the public must be installed with devices to purify cooking fumes.

Continued work is carried out to phase out various production technologies and installations that have caused serious pollution by emitting sulphur dioxide, smoke and particulates. Study on the technologies for controlling emission of nitrogen oxides from stationary sources such as power plant boilers, industrial boilers and restaurant boiling water furnaces has also been commenced since December 2005. The aim is to effectively control the emission of nitrogen oxides from these stationary sources by 2010. (http://www.epd.gov.hk/epd/tc_chi/news_events/legco/files/Chi-Annex2-210108.pdf)

NON-COMBUSTION

VOC control for petrol-related Industry

The SEPA has formulated three standards to reduce VOC emissions from delivery, storage and petrol filling, namely Emission Control of Air Pollutants for Oil Storage Facility (储油库大气污染物排放标准) (GB 20950 – 2007), Emission control of Air Pollutants for Transportation of Gasoline/Petrol (汽油运输大气污染物排放标准) (GB 20951 – 2007), and Emission Control of Air Pollutants for Gasoline/Petrol Filling Station (加油站大气污染物排放标准) (GB 20952 – 2007). These standards were in force from August 1, 2007. (<http://www.mep.gov.cn/tech/hjbz/bzwb/dqhjbh/>)

Reduction of emissions from VOC-containing Paint

Guangdong Provincial Government has formulated plan to reduce the emission of VOC from paints. By Year 2003, paints using xylene (VOC) as solvents, are prohibited. The legislation of Air Pollution Control in Pearl River Delta of Guangdong Province, which was announced by Guangdong Provincial Government on February 27, 2009 and will be in force on May 1, 2009, has regulated to stop using paints with high contents of VOC.

(http://www.gd.gov.cn/govpub/zfwj/zfxxgk/gz/200903/t20090330_88639.htm)

Installation of vapour recovery and implementation of vapour emission standards

The Government has planned to initiate vapour recovery at petrol filling stations, tanker trucks and oil depots. There is plan to implement from 1 January 2010 in the cities of the PRD Region vapour emission standards for all oil depots, tanker trucks and petrol filling stations.

Prohibition of new cement plants and extension of cement plants

The Government has also taken steps to continue phasing out various production technologies and installations that have caused serious pollution by emitting sulphur dioxide, smoke and particulates. 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 4000 tonnes. Projects of new dry-type rotary kiln cement plant with daily capacity of 2500 tonnes and below will be prohibited. The relocation project of Guangzhou Cement Plant, completed by end 2005, was estimated to reduce particulate emissions in the Region by approximately 3000 tonnes/year. Sanshui Area in Foshan City has closed down all vertical kiln cement production units by the end of 2008 (<http://mz.ss.gov.cn/qjmj/rdzt/2009021969100.shtml>).

Adoption of cleaner production

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 higher standard for cleaner production.

PROCESSING TRADE

In Year 2007, the Ministry of Commerce issued a circular calling on commerce departments at all levels to take environmental protection and energy consumption into consideration in evaluating production capacity of processing trade enterprises for approval to engage in processing trade activities. Promoting the ‘transformation and upgrading’ of processing trade and restricting industries of ‘high energy consumption, high pollution and resource consumption’ are China’s objectives for adjusting its processing trade policy.

In the PRD, processing trade activities including packaging, moulds, metal parts, metal electroplating, plastic parts, and bleaching/ printing/ dyeing are affected. Enterprises importing commodities for the affected trade are required to make 50 – 100% advance payment in deposit.

Urban Planning and Conservation

THE OUTLINE PLAN OF ENVIRONMENTAL PROTECTION IN THE PEARL RIVER DELTA REGION (珠江三角洲环境保护规划纲要) (2004-2020)

(<http://www.gdepb.gov.cn/hjgl/gjhj/zlxz/200510/P020051017795765658003.doc>)

(http://www.gd.xinhuanet.com/newscenter/ztbd/2006-08/25/content_7877674.htm)

Under the Outline Plan, old and small-scale industrial factories with significant emission need to be closed down in PRD. These include closing down of coal-fired power plant with capacity less than 50MW, and re-structuring of quarries by Year 2005. All major industrial sources should be relocated away from city centre. It is compulsory for major emission sources to install sulphur dioxide and nitrogen oxide reduction facilities by Year 2010. Factories in PRD are encouraged to adopt clean production and to implement environmental management system. VOC emission in the new developing area will also be controlled to limit its photochemical reaction into ozone.

The outline plan estimates that the SO₂, NO_x and PM₁₀ emission by Year 2010 need to be controlled to 398,000 tonnes, 418,000 tonnes and 284,000 tonnes, respectively. This will benefit the development of major industrial facilities in the major cities, such as Guangzhou, Foshan and Dongguan. Sensitive zones have been declared such that centralised control of emission from major industrial sources can be implemented.

Details of the key control strategies are listed as follows:

- Reduce SO₂ emission: By Year 2007, all coal/ gas-fired power plants with capacity more than 125MW should be equipped with flue gas desulphurization measures, and automatic monitoring system. Small plants need to be modified or phased out to improve its efficiency. By Year 2010, small kilns and furnaces, with less than 3 ton/hr and 10ton/hr

and of age more than 8 years old will be phased out. Centralised heat supply, fuel switching from coal to oil, gas or electricity will be investigated. Sulphur content in fuel will be limited to within 0.8%.

- Reduce PM emission: There is no plan to install new or expansion of existing cement plants. All existing cement plant, power company and furnace factories are required to install dust removal facility so as to comply with the new emission standard. All old and small plants will be phased out. Dust control measures shall also be implemented in construction sites. All restaurants are also required to install fume/oil removal facility.
- Reduce NO_x emission: The major task is to strengthen NO_x emission control of vehicle, and improve the quality of the gasoline by lowering the sulphur and alkene contents. Power plants are required to adopt NO_x reduction measures, which could be achieved by information exchange with other plants on emission control/ reduction technology. The monitoring network will be improved to check the effectiveness of control measures.

THE OUTLINE PLAN OF ENVIRONMENTAL PROTECTION IN GUANGDONG PROVINCE (广东省环境保护规划纲要) (2006 – 2020)

(<http://www.mep.gov.cn/law/hjjzcd/dfbf/200611/W020061130350555680392.pdf>)

The Outline Plan aims to control SO₂, PM and NO_x emissions from the pollutant sources, including power plant, non-metal mineral works and vehicular emission, meeting the daily and annual average to Level 2 ambient air quality standards by Year 2010. The number of days to meet these Level 2 standards should be more than 90% in Year 2010 and 95% in Year 2020.

The amount of SO₂ emission is controlled within 1.2 Million tonnes per year in Year 2010 and 1.0 Million tonnes per year in Year 2020.

The strategy is to increase the use of clean fuel and to encourage the use of nuclear and LNG power generation. The electricity transmission network will be improved to facilitate transmission of clean electricity from west to east. The use of large scale wind, solar and/or sea-wave powered plants will be investigated.

- Reduce SO₂ emission: By Year 2010, all plants should use fuel with sulphur content of less than 0.7% coal or 0.8% diesel oil, should flue gas desulphurization facilities are not installed. Otherwise, desulphurization reagent must be applied to the fuel. In the long run, coal-fired power plant, kiln and furnace should be phased out and replaced by LNG. A LNG transmission network will be constructed in the region.
- Reduce PM and VOC emission: PM control will be imposed on non-metal mineral works. Dust control measures will be implemented in construction sites and on haul road traffic. Power company and furnace factories are required to install particulate removal facility to comply with the emission standard. All restaurants are also required to install fume/oil removal facilities. Research studies will be conducted to investigate the effect of VOC on the photochemical smog, and the associated control measures.
- Reduce NO_x emission: By Year 2008, the Nation III standard for new vehicles will be implemented in PRD. Also, the fuel quality will be improved. The vehicle inspection and maintenance (I/M) programme will be improved and all non-conformance vehicles will be phased out. Vehicle labelling systems will be implemented, and dirty vehicle will not be allowed to enter the city centre when the air quality is extreme poor. Vehicle surveillance system will be planned and the ozone prediction system will be developed. All coal/oil fired power plants should adopt mitigation measures to reduce NO_x emission by Year 2010. The technology on emission control/ reduction should be improved such that emission from power plant, furnaces, and kilns can be significantly reduced. The number of vehicles in the cities will be controlled, and the emission standard from vehicles will be tightened.

Green transport will be developed under clean vehicle action programmes of major cities. Use of clean fuels, electric vehicles and advanced clean fuel motor vehicles are encouraged.

The "Planning of the Transport Routes for Inter-City High Speed Railway Network in the PRD Region" has been endorsed by the State Council in March 2005. Construction of PRD High Speed Transportation Network Project has started. Expressways in major cities, such as the district expressway in Southern Guangzhou and the Shenzhen-Shenping Express Trunk Road are being constructed. A regional rapid light-rail system is planned in the region.

THE GUANGDONG BLUE SKY PROJECT PLAN (广东省蓝天工程计划)

(http://www.gdepb.gov.cn/hjgl/ghjh/jihua/200510/t20051009_3212.html)

The Plan targets to control the SO₂ emission from power plants to 550,000 tonnes, 480,000 tonnes and 450,000 tonnes in Year 2000, Year 2005 and Year 2010, respectively. SO₂ emission from other industries is limited to 90% of Year 2000 emission level in Year 2010. The fugitive dust control measures will be enhanced, and targeted to cover 80%, 95% and 100% of the area as the control zone in Year 2000, Year 2005 and Year 2010, respectively. The control on major emission sources will be tightened; and small-scale cement plant, oil refinery, glass factory and coal-fired power plants will be phased out. The control on vehicular emission will be improved with the use of clean fuel. Sale of leaded petrol has been prohibited since Yr 1999.

Details of the Project Plan are listed as follows:

- Phasing out all the old heavily polluted industry, and tighten emission control on major emission sources. Installation of new coal/oil fired plant with capacity less than 12.5MkW in Guangdong is not allowed. Installation of new coal/oil fired power plants in the acid-rain controlling zone and PRD region is not allowed.
- Prioritise and increase the use of hydro-power, natural gas power, and nuclear power. Increase the use hydro-power from the south-west. Improve the LNG transmission network in the cities. Enhance the use of LNG, town gas or LPG for the restaurants. Encourage the use of LNG as fuel for power plants and phasing out small coal fired power plant.
- Restriction on use of high sulphur content fuel. In Year 2005, sulphur content is controlled within 0.8% in the acid-rain control, and 1.0% in other areas. In Year 2010, sulphur content will be controlled within 0.7% in the acid-rain control zone, and 0.8% in other areas.
- Flue gas desulphurization measures are required for alteration of existing power plant using 1% sulphur content fuel. Use of clean fuel, as an alternative, is encouraged.
- Tightened vehicle inspection and maintenance programme to ensure suitable converters are applied at the exhaust. Use of electric car and other clean fuel mass transport system are being investigated.
- Tighten the discharge permit system and improve the monitoring network; especially on major emission sources.
- Improve the control technology on SO₂, NO_x and PM removal.

C1.3 References

- ¹ Consultation Paper on the Future Development of the Electricity Market in Hong Kong, Stage II Consultation, Economic Development and Labour Bureau, December 2005.
- ² Final Report, Feasibility Study on Electronic Road Pricing, Transport Department, April 2001.
- ³ SAR Lags World in Tacking Pollution, The Standard, 16 September 2004.