

For information
25 September 2006

**LEGISLATIVE COUNCIL
PANAL ON ECONOMIC SERVICES**

**Future Development of the Electricity Market in Hong Kong –
Environmental Regulation in the Future Electricity Market**

PURPOSE

This paper reports to Members the latest development of environmental regulation on power sector, with a view to meeting the Government's emission reduction targets by 2010.

BACKGROUND

2. The Government is deeply concerned about the problem of air pollution. Apart from pursuing vigorously various emissions reduction or prevention measures, the Government has been co-operating with the Guangdong government since 2002 to drastically reduce the four major air pollutants in the Pearl River Delta (PRD) Region by 2010, i.e. sulphur dioxide (SO₂), nitrogen oxides (NO_x), respirable suspended particulates (RSP) and volatile organic compounds (VOC).

3. The air pollution generated in Hong Kong can be chiefly divided into two sources: mobile and stationary. The former mainly refers to emissions from vehicles whereas the latter is predominantly from power plants. For vehicles, the LPG taxis and minibus programmes implemented in recent years have effectively helped improve local air quality. The Government will continue to tighten the vehicular emission standards, and encourage and facilitate vehicles to adopt cleaner fuels and technologies. For other mobile sources such as vessels and aircraft, the Government will also continue to explore effective measures to reduce their emissions, despite their relatively low share of the total emissions.

4. The power plants make up the largest emission source within Hong Kong, accounting for 92% of the total emission of SO₂, and half of that of NO_x and RSP (see figure 1 below).

Figure 1: Composition of emission sources

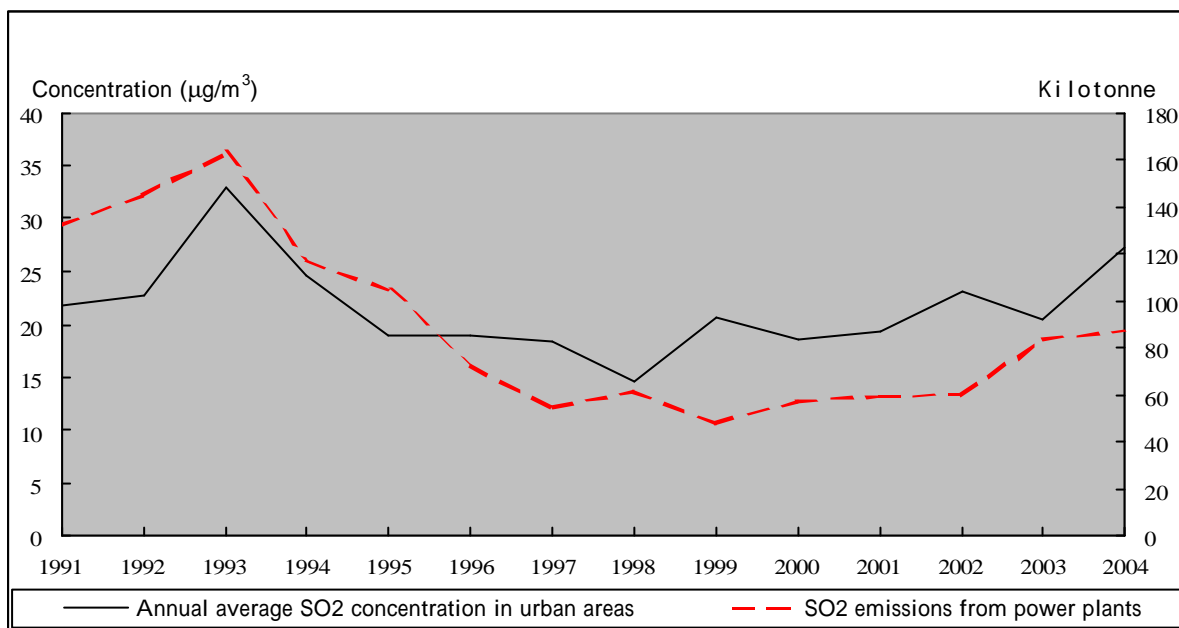
Sources	Share of total emissions in 2004 (%)			
	SO ₂	NO _x	RSP	VOC
Power Generation	92.3	48.5	50.8	0.9
Road Transport	0.1	26.6	24.9	16.8
Navigation	4.0	17.1	6.0	0.7
Others	3.6	7.8	18.3	81.6

5. Because of the increased use of coal by power plants in the last two years, the higher emissions have vitiated the effectiveness of many other emissions reduction measures. The total local emission of SO₂ has risen instead of reduced in recent years (see figure 2 below). Figure 3 clearly demonstrates that the SO₂ emission by local power plants is highly correlated to the local urban concentration of SO₂. In view of this, the Government has asked the power companies to reduce their emissions, in order to achieve the 2010 reduction targets. Since it takes time to plan for and implement emission reduction projects, the Environmental Protection Department stated clearly to the two power companies the emissions reduction targets as early as 2003, and that the total emissions caps would be gradually tightened upon the issue/renewal of Specified Process Licenses (SPLs) under the Air Pollution Control Ordinance, in order to achieve the 2010 reduction targets.

Figure 2: Emissions of various pollutants in Hong Kong

	Emission Level in 1997 (tonnes)	Emission Level in 2004 (tonnes)	Changes in Emission Level during 1997-2004	Reduction Target for 2010
SO ₂	64,500	94,800	+47%	-40%
NO _x	110,000	92,500	-16%	-20%
RSP	11,200	8,040	-28%	-55%
VOC	54,400	41,900	-23%	-55%

Figure 3: SO₂ emissions from local power plants and ambient concentration in urban areas



6. The current emissions reduction proposals of the two power companies, i.e. Hongkong Electric (HEC) and CLP Power (CLP), are as follows –

	Emission Reduction Measures	Commissioning Date	Reduction Efficiency (Note 1) (Percent)
HEC	Reducing SO₂ Emission: To retrofit two 350MW coal-fired generating units with Flue Gas Desulphurization Systems (Note 2)	July 2009 and April 2010 respectively	90%
	Reducing NO_x Emission: To retrofit two 350MW coal-fired generating units with Low-NO _x Burners	July 2009 and April 2010 respectively	60%
	Wind Power: To install a 0.8MW Wind Turbine unit	February 2006	~100%

	Emission Reduction Measures	Commissioning Date	Reduction Efficiency (Note 1) (Percent)
HEC	<p>Increasing Electricity Generation from Natural Gas:</p> <p>(1) To install a 335MW gas-fired Combined Cycle Gas Turbine unit</p> <p>(2) To install another 300MW class gas-fired Combined Cycle Gas Turbine unit (Note 2a)</p>	First firing completed in June 2006	RSP and SO ₂ : >90%; NO _x : >80%
CLP	<p>Reducing SO₂ Emission:</p> <p>To retrofit four 677MW coal-fired generating units with Flue Gas Desulphurization Systems (Note 3)</p>	Completion in phases from 2009 to 2011	90%
	<p>Reducing NO_x Emission:</p> <p>To retrofit four 677MW coal-fired generating units with Selective Catalytic Reduction Systems (Note 3)</p>	Completion in phases from 2009 to 2011	80%
	<p>Wind Power:</p> <p>To install a 0.8MW Wind Turbine unit</p>	Expected to be commissioned in 2007-2008	~100%
	<p>Increasing Electricity Generation from Natural Gas:</p> <p>(1) To commission two 312.5MW gas-fired Combined Cycle Gas Turbine units</p> <p>(2) Construct natural gas receiving terminal (Note 5)</p>	Commissioned in 2005 and 2006 respectively (Note 4) 2010-2011	RSP and SO ₂ : >90%; NO _x : >80%

(Note 1) As compared with a coal-fired generating unit with equivalent generating capacity and electrostatic precipitators of high efficiency

(Note 2) EPD granted the Environmental Permit for the project on 25 April 2006.

(Note 2a) Government has yet to receive any application for the project.

(Note 3) CLP submitted their application for an environmental impact assessment (EIA) Study Brief for the retrofit projects on 28 September 2005. In response, EPD issued an EIA Study Brief on 31 October 2005. CLP submitted the EIA Report on 21 June 2006 to DEP under the EIA Ordinance and the Report was considered suitable for public inspection on 15 August. The Advisory Council on Environment and the general public are being consulted.

(Note 4) Sufficient supply of natural gas is required to support emission reduction

(Note 5) CLP submitted an application for EIA Study Brief for their proposed LNG terminal in Hong Kong on 13 May 2005. In response, EPD issued an EIA Study Brief on 23 June 2005. CLP has yet to submit the EIA Report under the EIA Ordinance. The proposal is also subject to Government's approval pursuant to the Scheme of Control Agreement.

7. The retrofit proposals of HEC and CLP are not adequate to achieve the emission reductions needed for improving the air quality in Hong Kong and PRD by 2010. The two power companies have been clearly informed that the consideration or approval of their Financial Plans shall not be or be taken as a representation or promise that the Government considers or has accepted their emission reduction projects as adequate in meeting the intended emission caps as conditions which may be specified upon the renewal of SPLs pursuant to the Air Pollution Control Ordinance. To meet the intended caps for 2010, the power companies will need to take additional measures such as speeding up the current work programme, increasing the ratio of natural gas to coal in their fuel mix, reducing power supply to the Mainland and participating in emissions trading, etc.

ENVIRONMENTAL POLICY FOR THE POWER SECTOR

8. The Government's environmental policy towards the power companies has all along been clear and definite –

- (a) The power companies should use the best practicable means to reduce emissions as required in the Air Pollution Control Ordinance, and at the same time enhance the operational efficiency of the power plants and the combustion and generation efficiencies;
- (b) Power companies must use low-sulphur coal for the existing coal-fired generating units;
- (c) No new coal-fired generating units have been allowed since 1997;
- (d) Emissions caps will be set in any SPLs issued or renewed to power companies under the Air Pollution Control Ordinance; and
- (e) Power companies should actively consider adopting the most effective economic tools (including emissions trading) to achieve the emission reduction targets.

FUTURE REGULATORY APPROACH

9. For the long-term environmental regulation of the power sector, the Government has proposed in the “Stage II Consultation Paper on Future Development of the Electricity Market in Hong Kong” the following approach on regulating the environmental performance of the power sector.

Emissions Reduction

10. We have proposed the following measures to reduce the emissions of power plants -

- (a) To link the permitted rate of return on all fixed assets of the power companies to their achievement of the emission caps stipulated in the SPLs issued under the Air Pollution Control Ordinance and reduce such permitted rate of return if the companies do not achieve the caps. As a corollary, financial incentives in the form of “bonus” return will be provided to encourage the power companies to reduce their emissions to levels below those required in the SPLs;
- (b) To subject emission reduction facilities to the lowest rate of return (i.e. lower than all other assets) so as to avoid, as far as possible, the costs of emission reduction facilities being passed onto consumers and increasing their tariff burden; and
- (c) To provide financial incentives to the power companies for improving their performance in energy efficiency and energy conservation. The indicators involved will include demand side management (e.g. energy audit), promotion of energy conservation, and the amount of energy conserved. The practical performance of the power companies will be assessed according to the performance standard so set.

Renewable Energy

11. The Government is committed to the development of renewable energy in Hong Kong with a view to further improving our air quality and reducing our greenhouse gas emission. Renewable energy, in the form of wind, solar and waste-to-energy, offers proven alternatives to the burning of fossil fuels in electricity generation. In the First Sustainable Development Strategy for Hong Kong promulgated by the Government in May 2005, we,

after considering the local social, economic and environmental conditions, have set the target of having 1-2% of Hong Kong's total electricity supply met by renewable energy by 2012. The 2005 Policy Address also announced our intention to ask the power companies to use renewable energy in electricity generation in the new schemes of control for the post-2008 electricity market.

12. We have proposed to implement the following measures to promote the use of renewable energy in the Stage II Consultation Paper –

- (a) To give a higher rate of return for renewable energy infrastructure than all other assets so as to provide financial incentives to the power companies;
- (b) To provide “bonus” return to the power companies if they achieve the target for using renewable energy;
- (c) To institute a standard arrangement for renewable energy users to connect to the grid for backup supply; and to seek the agreement of the power companies to extend the arrangement to cover renewable energy systems with capacities above 200kW and to waive the nominal administrative fees for grid connection by renewable energy users;
- (d) To seek the agreement of the power companies to provide connection/access to their grids for generating facilities employing renewable energy, and to facilitate these facilities to connect and feed electricity to their grids; and
- (e) To have grid connection/access for renewable energy users/generating facilities using renewable energy negotiated between the prospective grid user and the respective power company, and the Government will assist where necessary and when requested by either party, including assisting in arriving at mutually agreed access charges.

WAY FORWARD

13. The Economic Development and Labour Bureau informed the Legislative Council Panel on Economic Services on 29 May 2006 of the views received during the Stage II Public Consultation. The Government will take into account these views and discuss with the power companies to

finalize the post-2008 regulatory arrangements for the electricity market.

Environmental Protection Department
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