

立法會
Legislative Council

LC Paper No. CB(1)517/10-11

Ref. : CB1/SS/5/10

Paper for House Committee meeting on 26 November 2010

**Report of the Subcommittee on Second Technical Memorandum
for Allocation of Emission Allowances in Respect of Specified Licences**

Purpose

This paper reports on the deliberations of the Subcommittee on Second Technical Memorandum (TM) for Allocation of Emission Allowances in Respect of Specified Licences.

Background

Emission reduction targets

2. To improve air quality, the Hong Kong Special Administrative Region Government reached a consensus with the Guangdong Provincial Government (GPG) in April 2002 to reduce the emissions of sulphur dioxide (SO₂), nitrogen oxides (NO_x), respirable suspended particulates (RSP), and volatile organic compounds by 40%, 20%, 55% and 55% respectively by 2010 as compared to 1997.

3. Power generation is the largest emission source in Hong Kong, accounting for 88% of SO₂, 44% of NO_x, and 28% of RSP emitted locally in 2008. For Hong Kong to achieve the 2010 emission reduction targets, it is essential for the power companies to substantially reduce their emissions of SO₂, NO_x, and RSP by 2010. Starting from 2003, the Administration has been engaging the two local power companies regarding the imposition of emission caps which have been imposed since 2005 upon renewal of their respective specified process licences. These emission caps have been progressively tightened to ensure that Hong Kong can meet the 2010 emission reduction target.

First Technical Memorandum for Allocation of Emission Allowances in Respect of Specified Licence (from 1 January 2010)

4. In accordance with section 26G of the Air Pollution Control Ordinance (Cap. 311) (APCO), the Secretary for the Environment (SEN) shall by technical memorandum allocate a quantity of emission allowances for each type of specified pollutant, i.e. SO₂, NO_x and RSP, in respect of each specified licence for the operation of power plant in relation to each emission year commencing on or after 1 January 2010.

5. The First TM was published in the Gazette on 7 November 2008. It set out the total quantity of emission allowances for all of the specified licences from 1 January 2010, allocation principles and determination methods of the quantity of emission allowances to be allocated in respect of each specified licence for each emission year, arrangements for adjusting the allocation of emission allowances, and arrangements for new comers.

6. A subcommittee was formed under the House Committee to study the First TM in November 2008.

Emission allowances for 2010

7. Under the First TM, the 2010 emission allowances for the power sector are as follows -

	1997 baseline emissions (tonnes per year)	2010 emission allowances in the First TM (tonnes per year)	Reduction compared to 1997 (%)
SO ₂	54 400	25 120	54%
NO _x	56 100	42 600	24%
RSP	2 610	1 260	52%

8. Emission allowances are allocated to individual power plants on a pro-rata basis in accordance with their respective share of the total amount of electricity generated for local consumption. For the 2010 emission allowances, the allocation to individual power plants is determined with reference to their total amount of electricity generated for local consumption for the five-year period from 1999 to 2003. To cater for the change of the market share in electricity generation, the allocation to individual power plants are updated regularly on the first of January of the year starting from

2010, and in any event not less than once every three years, in accordance with their respective share of total amount of electricity generated for local consumption for the past 60 months.

9. To provide sufficient lead time for power companies to adjust their operation (e.g. installation of additional emission abatement facilities, adjustment of fuel strategy and securing emissions trading opportunities), an advance notice of no less than four years will be given to the power companies before any changes to the allocation of emission allowances arising from the regular updating to take effect.

Arrangements for new comers

10. To cater for the requirements of potential new comers, each new comer will be temporarily allocated a small amount of emission allowances up to around 1% of the total emission allowances for the power sector. The new comer will be included in the subsequent updates and will be allocated with the updated quantity of emission allowances according to the prevailing allocation methodology.

Second Technical Memorandum for Allocation of Emission Allowances in Respect of Specified Licences (from 1 January 2015)

11. The Second TM was published in the Gazette on 15 October 2010, tabled on 20 October 2010 and shall come into operation in accordance with section 37C of APCO¹. In accordance with section 26G(4) of APCO, the new set of emission allowances will take effect at least four years after the commencement of the Second TM, i.e. starting from the emission year of 2015. To enable timely revision of the emission allowances, the Second TM will be reviewed at a frequency of no less than once every three years.

12. Under the Second TM, the specific emission allowances for each of the electricity works of the two power companies in relation to the emission years from 1 January 2015 are as follows –

¹ Pursuant to section 37C of the Ordinance, the Second TM shall commence to have effect upon the expiry of period as extended (i.e. 8 December 2010) if LegCo does not pass a resolution to amend it. In the case where LegCo passes a resolution amending the Second TM, it shall come into effect on the day of the publication in the Gazette of such resolution.

	Emission Allowances for Existing Electricity Works (Tonnes Per Year)		
	Sulphur dioxide	Nitrogen oxides^{Note 1}	Respirable suspended particulates
Hongkong Electric Co. Ltd. (HEC)			
Lamma Power Station (mixed fuel)	6 780	10 020	300
Subtotal^{Note 2}	6 780 (72%)	10 020 (63%)	300 (64%)
CLP Power Hong Kong Limited (CLP)			
Black Point Power Station (gas-fired)	1 440	4 140	110
Castle Peak Power Station (coal-fired)	4 260	13 390	420
Penny's Bay Gas Turbine Power Station (oil -fired) ^{Note 3}	2	2	1
Subtotal^{Note 2}	5 702 (36%)	17 532 (66%)	531 (67%)
Total^{Note 2}	12 482 (50%)	27 552 (65%)	831 (66%)

Note 1 Expressed as nitrogen dioxide.

Note 2 The figures in brackets compare the new emission allowances with the current emission allowances under the First TM in percentage terms.

Note 3 As the Penny's Bay Gas Turbine Power Station is for emergency and peak-logging purposes, the projected SO₂, NO_x and RSP emissions for the purposes are one to two tonnes.

13. As compared with the emission allowances allocated under the First TM, the Second TM will achieve a further tightening on emission caps as follows -

	2010 emission allowances in the First TM (tonnes per year)	2015 emission allowances to be included in the Second TM (tonnes per year)	Reduction compared to 2010 (%)
SO ₂	25 120	12 482 (120) ^{Note}	50%
NO _x	42 600	27 552 (270) ^{Note}	35%
RSP	1 260	831 (8) ^{Note}	34%

^{Note} The maximum emission allowances for new electricity works with a total installed capacity equal to or more than 300 MW, which is about 1% of the total emission allowances for the entire power sector. For those less than 300 MW, the existing practice of allocating the emission allowances by multiplying the respective maximum emission allowances set out in the above table with the ratio of the total installed capacity to 300 MW will be continued.

The Subcommittee

14. At the House Committee meeting held on 22 October 2010, Members agreed to form a subcommittee to study the Second TM. Hon Audrey EU Yuet-mee was elected chairman of the Subcommittee, and the membership list of the Subcommittee is in **Appendix I**.

15. To allow time for the Subcommittee to study the Second TM, a resolution was passed at the Council meeting on 10 November 2010 to extend the scrutiny period to 8 December 2010. The Subcommittee has held three meetings with the Administration.

Deliberations of the Subcommittee

Allocation of emission allowances to individual power plants

Methods of allocation

16. The Subcommittee notes that under the First TM, emission allowances were allocated to individual power plants on a pro-rata basis in accordance with their respective share of the total amount of electricity generated for local consumption. This would ensure all power plants

receive the same quantity of emission allowances per unit of electricity generated.

17. Under the Second TM, the emission allowances to be allocated by assuming the maximization of the use of existing gas-fired generation units and prioritization of the use of coal-fired units that have been retrofitted with emission abatement equipment. The specific emission allowances for each specified pollutants are determined according to the following formula –

$$\begin{array}{l} \text{Emission allowances to be allocated} \\ \text{for each of the specified pollutants} \\ \text{(tonnes)} \end{array} = \begin{array}{l} \text{Electricity} \\ \text{generation} \\ \text{(GWh)} \end{array} \times \begin{array}{l} \text{Emission factor* for} \\ \text{specified pollutant} \\ \text{(tonnes per GWh)} \end{array}$$

* *Emission factor refers to emissions per unit electricity generation.*

According to the Administration, the forecast local electricity generation requirements (excluding the export sale) in 2015 are 13 097 GWh (4 057 GWh from natural gas and 9 040 GWh from coal) and 26 516 GWh (16 425 from natural gas and 10 091 from coal) for HEC and CLP respectively. The emission allowances to be allocated for individual power stations based on the emission factors of the generation units for 2015 are listed in Annex 1 of LC Paper No. CB(1)410/10-11(02).

18. The Subcommittee also notes that no emission allowance was allocated to the power stations for electricity generated for non-local consumption. At present, about 8% of electricity generated by CLP in Hong Kong is exported to the Mainland. If the company intends to continue export electricity, it has to meet the emission caps by additional emission reduction efforts, for example, through emissions trading or procuring higher quality fuel such as ultra-low sulphur coal.

Allocation of emission allowances and actual emission levels

19. In order to assess whether the emission allowances as set out in the Second TM could be further tightened, the Subcommittee requests the Administration to provide the allocation of emission allowances for each of the power stations in 2010 and the actual emission levels for the year. The information provided by the Administration, together with the emission allowances under the Second TM from 2015 onward, is set out in the table below –

Emission Allowances for Power Stations (Tonnes Per Year)									
	Sulphur dioxide (SO ₂)			Nitrogen oxides (NO _x)			Respirable Suspended Particulates (RSP)		
	2010 allowance	2010 actual *	2015 allowance	2010 allowance	2010 actual *	2015 allowance	2010 allowance	2010 actual *	2015 allowance
Lamma Power Station and Extension (HEC)	9 370	3 553	6 780	15 890	7 364	10 020	470	176	300
Black Point Power Station (CLP)	8 617	128	1 440	14 612	1 378	4 140	433	50	110
Castle Peak Power Station (CLP)	7 135	9 981	4 260	12 099	11 520	13 390	358	522	420
Penny's Bay Gas Turbine Power Station (CLP)	2	0.003	2	2	0.46	2	1	0.01	1

* The actual emission levels of each of the power stations are from January to September 2010, which are subject to change upon auditing and verification.

20. Some members, including Hon Audrey EU, Hon KAM Nai-wai and Hon Cyd HO, have expressed concern that some of the 2015 emission allowances are higher than the actual levels of emission in 2010. Hon Audrey EU points out that the 2015 emission allowances for NO_x and RSP for the Castle Peak Power Station is higher than those for 2010. Hon KAM Nai-wai urges the Administration to consider lowering the emission allowances under the Second TM for SO₂ for the Lamma Power Station and its Extension to the actual emission level of the same pollutant in 2010.

21. The Administration has advised that the power companies have just retrofitted existing coal-fired generation units with emission abatement equipment for achieving the emission reduction targets under the First TM. The abatement equipment will be at their best emission performance, thereby reducing the emissions in 2010 to a very low level. However, these levels should not be used as a reference for allocating emission allowances for the Second TM as the emissions could be increased as a result of the declining performance of the abatement equipment over time and the need to deploy generation units without additional abatement equipment to meet the increase in electricity demand. The Administration has explained that the methods

used in ascertaining the quantity of emission allowances under the First and Second TM are different. The Second TM allocates emission allowances directly for each power station based on the types of fuel used by their generation units and availability of emission abatement equipment therein. For example, since the Castle Peak Power Station uses coal as the primary fuel and could not afford to retrofit further abatement equipment due to space constraints, it is allocated higher emission allowances for NO_x and RSP than those under the First TM. As the Lamma Power Station and its Extension may have to deploy those coal-fired generation units without emission abatement retrofit for power generation for meeting the growing demand for electricity in the coming years, more emission allowances than the actual emission level in 2010 need to be given to the emission of SO₂ from 2015 onward. As the book lives of these old generation units will expire starting from 2017, the Administration considers it not cost-effective to install the flue gas desulphurization systems for them, not to mention the space constraint. Despite the fact that HEC has converted two back-up oil-fired generation units at the Lamma Power Station into a gas-fired one to increase power generation efficiency by about 12%, the company will have to procure higher quality coal in order to meet the emission caps under the Second TM.

22. Hon CHAN Kin-por considers that if capacity allows, more stringent emission caps should be imposed by, for instance, replacing those coal-fired generation units without emission abatement equipment with gas-fired generation units. Hon Fred LI asks whether there are plans to replace existing generation units in the next ten years. The Administration has explained that any further substantial emission reduction can only be attained through major revamp of the fuel mix which would require careful consideration of the overall fuel mix strategy, advanced planning and prior consultation. There is no plan to commission new generation units before 2015, but the situation by 2020 will depend on the actual growth on electricity demand.

23. Hon KAM Nai-wai enquires about LegCo's power to amend the emission allowances in the TM. The legal adviser to the Subcommittee has advised that in accordance with section 37B of APCO which mirrors section 34(2) of the Interpretation and General Clauses Ordinance (Cap. 1), LegCo has power to amend the TM in any manner consistent with the power to issue it. According to section 26G(2) of APCO, in making an allocation for a type of specified pollutant, SEN shall:

- (a) have regard to the best practicable means for preventing the emission of that type of pollutant;
- (b) have as his purpose the attainment and maintenance of any relevant air quality objective; and

- (c) have regard to whether the emission of that type of pollutant would be, or be likely to be, prejudicial to health.

According to the legal adviser to the Subcommittee, if the Subcommittee or any Member intends to move a resolution to amend the emission allowance for any specified pollutant in the TM, it should have regard to the above-listed factors.

24. The Subcommittee further notes that the Lamma Power Station and its Extension has demolished two existing light oil tanks, relocated pipeworks and optimized the usage of the plant space in order to make room for the installation of three flue gas desulphurization systems for meeting the 2010 emission caps. Hence, there is no room and it is not cost-effective to retrofit the two remaining aged coal-fired units which would reach the end of book lives in 2017 or 2018. Hon KAM Nai-wai has expressed the views that as it is not practicable for him to forecast the growth in electricity demand for 2015 and beyond, he therefore would not propose amendment to lower the emission allowances for the Lamma Power Station under the Second TM.

Factors contributing to achieving the emission reduction targets

25. Hon Cyd HO has enquired about the factors, such as energy conservation and use of nuclear energy, in achieving the emission reduction targets in the Second TM. The Administration has advised that while it is difficult to estimate the exact contribution of energy conservation in achieving the emission reduction targets, promoting energy conservation has been an on-going effort of the Government and the community and it is forecast that the annual growth rate in electricity demand for the coming years is just about 1% to 2%, as opposed to the forecast Gross Domestic Product growth rate of about 4% or more per annum.

26. According to the Administration, the Memorandum of Understanding on Energy Co-operation signed between Hong Kong and the Mainland in 2008 will make available additional supply of natural gas to Hong Kong² in the coming few years. CLP will be able to increase the local electricity generated by natural gas from the current level of about 10 900 GWh to about 16 430 GWh and HEC from about 3 680 GWh to about 4 060 GWh. Depending on the individual specified pollutants, maximizing the use of gas-fired generation units would contribute about 74% to 96% and about 67% to 72% of reductions required for achieving the emission reduction targets under the Second TM for CLP and HEC respectively. The remaining

² New gas sources are being identified near Yacheng gas field off Hainan Island and by expanding the storage facilities in Shenzhen for liquified natural gas imported from overseas (e.g, Australia or Indonesia) for the use of Hong Kong.

emission reduction, i.e. about 4% to 26% for CLP and about 28% to 33% for HEC would be contributed by prioritizing the use of coal-fired generation units that have been retrofitted with emission abatement equipment.

27. As regards the use of more nuclear energy, the Administration has stressed that the Second TM has not considered the new fuel mix proposed for 2020. The proportion of nuclear energy in the fuel mix for emission years starting from 2015 should remain to be 20% to 23%.

Review of the Second TM

28. The Subcommittee notes that although the First TM stipulated that a review of the TM should be conducted at a frequency not less than once every three years, SEN has acceded to the request of the Subcommittee formed to study the First TM and conducted a review within two years after its coming into operation. In response to Subcommittee members' request for a review of the Second TM be conducted within two years, the Administration has initially advised that following tightening of emission caps in the First and Second TMs, any further major reduction in the emissions from the power sector could only be achieved through major revamp of the fuel mix, which requires advanced planning and prior consultation. Upon the Subcommittee's repeated urge to re-consider the request taking into account the rapid changes in the associated technologies and the possibility in revamping fuel mix sooner, the Administration agreed to amend section 2.5 of the Second TM and change the review frequency to not less than once every two years. It also agrees to report the review outcome to the Panel on Environmental Affairs upon completion of any future review of the Second TM.

Proposed amendments

29. In addition to the amendment to the review frequency, the Subcommittee also supports the Administration's proposed amendments to section 2.1 of the Chinese text of the Second TM from "每種指明污染物獲配的排放限額" to "每種指明污染物獲分配的排放限額".

Advice sought

30. Members are invited to note the deliberations of the Subcommittee.

**Subcommittee on Second Technical Memorandum
for Allocation of Emission Allowances in Respect of Specified Licences**

Membership List

Chairman Hon Audrey EU Yuet-mee, SC, JP

Members Hon Fred LI Wah-ming, SBS, JP

Hon KAM Nai-wai, MH

Hon Cyd HO Sau-lan

Hon CHAN Hak-kan

Hon CHAN Kin-por, JP

Hon Tanya CHAN

(Total : 7 members)

Clerk Ms Debbie YAU

Legal Adviser Ms Clara TAM

Date 2 November 2010