

立法會
Legislative Council

LC Paper No. CB(1)162/12-13

Ref: CB1/SS/3/12

Paper for the House Committee

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

Purpose

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

Background

2. The Air Pollution Control Ordinance (Cap. 311) ("the APCO"), empowers the Administration to set emission caps for power plants for improving air quality in Hong Kong. Section 26G of the APCO provides for the Secretary for the Environment ("SEN") to allocate emission allowances for three specified pollutants, i.e. sulphur dioxide ("SO₂"), nitrogen oxides ("NO_x") and respirable suspended particulates ("RSP"), for electricity power plants by way of a TM.

3. Two TMs were issued in 2008 and 2010 respectively. The First TM sets the emission allowances for the emission years between 2010 and 2014 while the Second TM tightens the emission allowances starting from 1 January 2015. The emission allowances in the second TM were determined with due regard to maximizing the use of existing gas-fired generation units and prioritizing the use of coal-fired generation units equipped with advanced emission control devices. SEN also committed to reviewing the TM not less than once every two years after its commencement.

4. After reviewing the Second TM, the Administration has found scope to further reduce the emission allowances for the two power companies, namely the CLP Power Hong Kong Limited ("CLP") and the Hongkong Electric Co. Ltd. ("HEC"), starting 1 January 2017 as long as they continue their efforts to use low emission coal as far as possible, upkeep the performance of the existing advanced emission abatement equipment, and take up the surplus of electricity generated from renewable energy ("RE") and waste-to-energy ("WTE") facilities, on top of their efforts to meet the emission allowances in the Second TM.

Third Technical Memorandum for Allocation of Emission Allowances in respect of Specified Licences (from 1 January 2017)

5. The Third TM was gazetted on 19 October 2012 and tabled in the Legislative Council ("LegCo") on 24 October 2012. Subject to any amendment by LegCo, the new set of emission allowances will take effect four years after its commencement, i.e. starting from the emission year of 2017 in accordance with section 26G(4) of the APCO. To enable timely revision of the emission allowances, the Third TM will be reviewed no less than once every two years.

6. Under the Third TM, the emission allowances for existing electricity works of the two power companies starting 2017 (tonnes per year) are set out in the table below –

	Emission allowances for existing electricity works starting 2017 (tonnes per year)		
	SO ₂	NO _x ^[@]	RSP
Hongkong Electric Co. Ltd. Lamma Power Station and Lamma Power Station Extension (mixed fuel)	5 200	9 450	250
Subtotal	5 200 [-23%]	9 450 [-6%]	250 [-17%]
CLP Power Hong Kong Limited			
Black Point Power Station (gas-fired)	1 440	4 140	110
Castle Peak Power Station (coal-fired)	3 757 [-12%]	12 358 [-8%]	389 [-7%]
Penny's Bay Gas Turbine Power Station (oil-fired) ^[#]	2	2	1
Subtotal	5 199 [-9%]	16 500 [-6%]	500 [-6%]
Total	10 399 [-17%]	25 950 [-6%]	750 [-10%]

^[@] Expressed as nitrogen dioxide.

^[#] As the Penny's Bay Gas Turbine Power Station is for emergency and peak-opping purposes, the projected SO₂, NO_x and RSP emissions are nominal, i.e. one to two tonnes.

^[1] The figures in square brackets are the percent reduction comparing with the emission allowances stipulated in the Second TM.

7. As compared with the Second TM, the Third TM will tighten the emission allowances for SO₂, NO_x and RSP by 17%, 6% and 10% respectively.

The Subcommittee

8. At the House Committee meeting on 26 October 2012, Members agreed that a subcommittee should be formed to examine the Third TM. Under the chairmanship of Hon Cyd HO Sau-lan, the Subcommittee has held one meeting to discuss with the Administration. The membership list of the Subcommittee is in **Appendix I**.

Deliberations of the Subcommittee

Emission allowances for existing electricity works

Allocation methodology

9. Members have enquired how the quantities of emission allowances to be allocated to the four existing electricity works (i.e. the Lamma Power Station and Lamma Power Station Extension, the Black Point Power Station, the Castle Peak Power Station and the Penny's Bay Gas Turbine Power Station) under the Third TM are determined.

10. The Administration has explained that when determining the emission allowances under the new TM, it has made reference to a number of considerations, including the best practicable means ("BPM") for electricity works to reduce emissions by using more low emission coal, upkeeping the performance of the existing emission control equipment, and taking up the generation of RE and WTE. The emissions to be avoided for each unit of electricity tapped from RE and WTE would be equal to the unit emissions from all coal-fired generation units of respective power companies. The Administration will deduct such emissions to be avoided by the anticipated annual electricity intake of RE and WTE (i.e. sent-out of 2 GWh and 21 GWh for HEC and CLP respectively) from the emission allowance allocations according to the unit emission factors for coal-fired generation units and the reduced electricity generation figures.

11. The Administration has also advised that since the generation of RE and WTE could be affected by exogenous factors, such as changes in weather patterns and heat contents of the refuse or sludge, it has provided a mechanism in the Third TM for ascertaining the emission allowances according to the actual annual intake of the electricity generated from RE and WTE. Hence, the formula for determining the emission allowances to be allocated to each of the

existing electricity works from 2017 onwards is as follows –

Emission allowances to be allocated and ascertained	=	Emission allowances that are required with the use of BPM at anticipated annual electricity intake of RE and WTE	plus / minus	Emission allowances to be added / deducted due to deviation of the actual annual intake of RE and WTE from the anticipated annual intake (i.e. sent-out of 2 GWh and 21 GWh for HEC and CLP, respectively) in accordance with the unit emission factors of coal-fired generation units
---	---	--	--------------	--

12. The Administration has further explained that as the Lamma Power Station and Lamma Power Station Extension and the Castle Peak Power Station use coal as fuel, the emission allowances for them are determined by applying the above formula which takes into account the uncertainty in the amount of electricity intake from RE and WTE. On the other hand, the Black Point Power Station is gas-fired and the electricity intake of RE and WTE does not displace electricity generation from these units. The Penny Bay's Gas Turbine Power Station is for emergency and peak-opping purposes, thus the projected SO₂, NO_x and RSP emissions are nominal, i.e. only one to two tonnes.

Emission reduction targets

13. Members have enquired whether the achievement of the new emission caps as stipulated in the Third TM are conducive to attaining the proposed new Air Quality Objectives ("AQOs") for the relevant pollutants. The Administration has responded that the further tightening of the emission allowances for the power sector under the Third TM is one of the emission control measures to help attain the new AQOs which will take effect in 2014. In response to members' concern about the emission reduction target of SO₂, the Administration has advised that the Second TM has tightened the emission cap for SO₂ by 50% as compared to the First TM whereas the Third TM has required a further decrease of 17%, representing a substantial level of reduction starting 2015. Besides, the Administration has also adopted measures to control other sources of SO₂ emission, including vessels and motor vehicles. Hence, it is expected that the relevant new AQOs for SO₂ can be achieved.

14. Members are also concerned about the relatively low reduction level of NO_x emission required by the Third TM, as highlighted by a green group. The Administration has explained that NO_x is produced as a result of the combustion of fuels in power generation. Unlike SO₂ and RSP, the emission abatement

means available for reducing NO_x emission is limited. Apart from maximizing the use of their existing gas-fired generation units and prioritising the use of their coal-fired generation units equipped with advanced emission control devices, the two power companies can achieve reduction in NO_x emission by using more low emission coal in electricity generation. However, the effectiveness of low emission coal for reducing NO_x emission is not as high as that for SO₂ and RSP emission as NO_x is also formed by the reaction of the oxygen and nitrogen directly in the combustion air. The continued growth in electricity demand, which leads to more frequent use of coal-fired generation units without retrofitted with advanced emission control equipment, will also partly offset the effectiveness of this additional emission reduction measure. Therefore, the reduction level of NO_x emission to be achieved under the Third TM is relatively lower.

Penalty for non-compliance

15. Members have enquired about the penalty for non-compliance with the emission caps. The Administration has advised that under section 30B of the APCO, the maximum penalty for exceeding the emission caps for pollutants is a fine of \$30 000 in respect of each tonne of the relevant actual emission in excess of the relevant allowed emission on a first conviction. On a second or subsequent conviction, the maximum penalty is a fine of \$60 000 in respect of each tonne of the relevant actual emission in excess of the relevant allowed emission, and imprisonment for 6 months. Besides, the exceedance will be carried forward and considered as part of the emissions which need to be reconciled in the following year.

Emission allowances for new electricity works

16. Members have enquired whether the Administration anticipates that there will be any newcomers entering the electricity generation industry in Hong Kong between now and 2017 and if so, the type of fuel to be used by the newcomers. The Administration has advised that similar to the First and Second TM, the Third TM provides an allocation of not more than 1% of the total emission allowances of the power sector in respect of each of the specified pollutants for any possible new electricity works, so as to ensure that they will not be debarred from starting their business even with the use of the most advanced emission reduction technology. The Administration has further indicated that there might not be any new entrants during the relevant period, given the long lead time to design and build a new power generation plant and to undergo the relevant statutory processes, e.g. environmental impact assessment, construction works etc. Nevertheless, the arrangements allow them to enter the industry. As for the type of fuel to be used, the Administration advised that any

new power generating units to be installed, whether by the existing power companies or newcomers, will be gas-fired under the established government policy.

Promotion of energy conservation and use of low emission coal

17. Members have expressed concern about the lack of initiatives in the Third TM to encourage the two power companies to achieve emission reduction by promoting energy conservation. The Administration has explained that while energy conservation is not one of the direct technical considerations in setting the emission caps for the Third TM, the Government has taken various measures to encourage energy conservation as demand side management, including the provision of financial incentives to encourage members of public and non-government organizations to reduce electricity consumption. For example, the Environment and Conservation Fund provides funding support to various energy efficiency and energy conservation projects. The Administration has also advised that the electricity demand in the last two years was on an upward trend. The Administration will monitor the change in demand and will take this into account when reviewing the Third TM for further tightening of the emission caps. If the overall electricity demand falls, there will be a case to reduce the emission caps in the new TM.

18. Members note that the overall share of natural gas in the combined fuel mix of the two power companies for local electricity generation under the Third TM will be about 50%. Given that the supply of natural gas is not stable, members have asked whether the power companies are allowed to substitute natural gas with low emission coal in their fuel mix, thereby achieving the optimum fuel cost for the benefit of consumers.

19. According to the Administration, the use of natural gas in local electricity generation was on the low side in the past two years due to the insufficient and unstable supply of natural gas. However, the West-East Natural Gas Pipeline will make available additional supply of natural gas to Hong Kong for enabling the power companies to maximize the utilization of their existing gas-fired generation units. Hence, the power companies will be able to increase the electricity generated by natural gas. Regarding the promotion of RE, the Government provides financial incentives to the power companies to encourage the development and use of RE. The current Scheme of Control Agreements specifies a higher permitted rate of return of 11% for investment in RE infrastructure. As for the power companies, they are carrying out studies on the construction of large-scale offshore wind farms in Hong Kong to generate electricity.

20. On the use of low emission coal, the Administration has advised that the two power companies have increased the use of such coal in recent years. To meet the requirements of the Second and Third TMs, it is expected that the use of low emission coal would be further increased and account for about 20% and about 40% of the total amount of coal used for electricity generation respectively in 2015 and 2017. Given that the energy performance of low emission coal is lower than that of other coal and their supply is limited, low emission coal cannot fully replace other coal in electricity generation. Nevertheless, as it is the Government's policy that all new electricity generating units should be powered by natural gas with effect from 1997, the existing coal-fired generation units will be phased out and the share of coal in the future fuel mix of local electricity generation will be decreased progressively.

Views of the two power companies

21. Noting that both power companies consider the proposed new emission allowances extremely challenging, members have asked about the difficulties faced by them in complying with the tightened requirements. According to the Administration, the two companies have indicated that the achievement of the new emission targets under the Third TM would hinge on a number of factors, including the stable supply of low emission coal with consistent properties which cannot be assured in the very volatile fuel market, the sufficient supply of natural gas, the consistently high performance of their emission reduction devices during the relevant period and no exceptional increase in electricity demand. Notwithstanding the difficulties, the power companies are prepared to support the Administration's objective to continuously reduce emissions.

Tariff implications

22. Members have enquired about the cost implications of the Third TM on electricity tariff due to the increased use of cleaner fuels (such as natural gas and low emission coal) and RE by the two power companies. The Administration has advised that achieving the proposed emission caps starting 2017 does not involve new capital investment by power companies. Also, the Third TM has not proposed any significant change to the fuel mix of the power companies as compared with the Second TM. Hence, there should be no question of the power companies having to increase electricity tariff in order to meet the tightened emission requirements under the Third TM. In any case, the fuel cost is subject to international market prices and the power companies will present their tariff assessment to the Administration annually in accordance with the prevailing regulatory mechanism.

23. To ascertain the impact of RE development on the power companies' costs, members have requested the Administration to provide information on the percentage of the two companies' investment in RE development in their overall

costs of electricity generation. The Administration has advised that the key RE project undertaken by HEC is the installation of photovoltaic panels at its Lamma Power Station by two phases. By early 2013, the generation capacity of the system will be enhanced to 1 megawatt, with an expected annual output of about 1.2 million kWh of electricity. In addition, a wind turbine with a capacity of 800 kilowatt was commissioned in February 2006. CLP has also installed the first standalone RE generation and storage system including both solar panels and wind turbines on Town Island, with a capacity to generate electricity up to around 200 kilowatt. Besides, both power companies are also studying the feasibility of developing offshore wind farms.

24. According to the Administration, investment of the two power companies in RE currently accounts for less than 1% of their respective total asset value and the impact on overall costs of electricity generation is negligible.

Advice sought

25. Members are requested to note the deliberations of the Subcommittee.

Council Business Division 1
Legislative Council Secretariat
14 November 2012

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

Membership list

Chairman Hon Cyd HO Sau-lan

Members Hon CHAN Hak-kan, JP
Hon WU Chi-wai, MH
Dr Hon Kenneth CHAN Ka-lok
Hon Dennis KWOK
Hon SIN Chung-kai, SBS, JP

(Total : 6 Members)

Clerk Ms Miranda HON

Legal Adviser Miss Kitty CHENG

Date 6 November 2012