

LEGISLATIVE COUNCIL BRIEF

Air Pollution Control Ordinance (Cap. 311)

Fourth Technical Memorandum for Allocation of Emission Allowances in Respect of Specified Licences

INTRODUCTION

Pursuant to section 26G of the Air Pollution Control Ordinance (Cap. 311) (the Ordinance), the Secretary for the Environment (the Secretary) has made the "Fourth Technical Memorandum for Allocation of Emission Allowances in Respect of Specified Licences" (the Fourth TM) at **Annex** to tighten the emission allowances for the two power companies with a view to improving air quality. The emission allowances apply to three types of air pollutants, i.e., sulphur dioxide (SO₂), nitrogen oxides (NO_x) and respirable suspended particulates (RSP), to be allocated in respect of each specified licence to conduct electricity works for each emission year from 1 January 2019.

JUSTIFICATIONS

2. Section 26G(2) of the Ordinance provides for the Secretary to allocate the emission allowances for each type of specified pollutant allocated in respect of each specified licence to conduct electricity works by a technical memorandum¹ (TM).

3. In 2012, the Secretary issued the "Third Technical Memorandum for Allocation of Emission Allowances in Respect of Specified Licences" (the Third TM) to allocate emission allowances in relation to each emission year commencing on 1 January 2017 for each of the electricity works of the two power companies. To meet the emission allowances under Third TM, both power companies should continue to keep the share of natural gas in the fuel mix of local electricity generation close to 50%, prioritize the use of coal-fired generation units equipped with advanced emission control equipment and upkeep properly their emission control devices.

¹ Section 26G(2) of the Ordinance provides that in making an allocation of emission allowances, the Secretary shall-

- (a) have regard to the best practicable means for preventing the emission of that type of pollutant;
- (b) have on 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.

4. Retrofitting the existing generation units with further emission reduction devices is not a practicable option because of the extensive retrofit that the two power companies have undertaken in recent years. Moreover, the fuel mix for power generation in the long run is being reviewed by the Environment Bureau. The focus of this review is thus on further measures that could be introduced as best practicable means (BPM), particularly the upkeeping of their emission control equipment, to further reduce the emission allowances under the electricity demand forecast for 2019. In anticipation that a new fuel mix for the long run could take shape in 2015, we plan to conduct another review of the emission allowances next year for 2020 and thereafter.

5. When reviewing the Third TM, the Administration have taken note of new developments or information revealed after the setting of the Third TM. These include:

- (a) the emission reduction efficiency of some of emission control devices retrofitted in recent years has been better than their design level;
- (b) the natural gas delivered so far from the West-East Gas Pipeline II (WEP II) that was commissioned in 2013 contains less sulphur than the limit prescribed in the supply contract; and
- (c) by 2019, the power sector will complete the phasing out of heavy fuel oil by ultra-low sulphur diesel for assisting coal-burning.

6. Having taken these factors into account together with the projected local electricity consumption for 2019, we have worked out the respective emission allowances for 2019 for the two power companies as follows ó

- (a) For The Hongkong Electric Company, Limited (HEC), it is forecast that the electricity demand for the Hong Kong Island will be reduced by around 4% in 2019 as compared to the projection for 2017 when setting the Third TM because there will be no major growth in demand by infrastructure development during the period and that the energy efficiency and conservation initiatives introduced by the Government, such as the Buildings Energy Efficiency Ordinance will help reduce electricity consumption. The operation of the company's coal-fired generation units will be reduced, thus providing scope for reducing the emission allowances.

If its emission reduction devices are properly maintained, its emission allowances could be reduced by 18% for SO₂, 5% for NO_x and 20% for RSP as compared to the levels in the Third TM.

- (b) For CLP Power Hong Kong Limited (CLP), it is forecast that its local electricity generation in 2019 will increase by around 4% as compared to the projection for 2017 when setting the Third TM, because of the electricity demand growth in Kowloon, the New Territories and Lantau as a result of population growth as well as infrastructure, commercial and new housing developments in the area. The increase in the electricity demand will have to be met by additional output from its coal-fired generation units. As for RSP and NO_x, CLP can absorb the increase in emissions by properly maintaining their emission reduction devices so that their prevailing emission control performance can be sustained. As for SO₂, due to the fact that the natural gas supplied so far via WEPII has a lower sulphur content than the stipulated limit in the supply contract, its emission allowance for SO₂ could be reduced by 4% despite the increase in electricity demand in 2019 as compared with the 2017 levels.

7. Details of the proposed emission allowances for the existing electricity works of the two power companies in 2019 are presented in Table 1 below. To put these figures into perspective, we have also presented the reductions relative to the respective Third TM levels for reference.

Table 1: Projected Emissions for Existing Electricity Works in 2019 (tonnes per year)

		Sulphur dioxide	Nitrogen oxides ^[@]	Respirable suspended particulates
HEC	Lamma Power Station and Lamma Power Station Extension (mixed fuel)	4 250 [-18%]	8 980 [-5%]	200 [-20%]
	Black Point Power Station (gas-fired)	290 [-80%]	4 140 [-0%]	110 [-0%]
CLP	Castle Peak Power Station (coal-fired)	4 678 [+25%]	12 358 [-0%]	389 [-0%]
	Penny's Bay Gas Turbine Power Station (oil -fired)	2 [-0%]	2 [-0%]	1 [-0%]
	Total of CLP's Stations	4 970 [-4%]	16 500 [-0%]	500 [-0%]

^[@] Expressed as nitrogen dioxide

Note: The figures in square brackets are the percent reduction comparing with the emission allowances stipulated in the Third TM.

8. For renewable energy (RE), facilities covered in the last review include the Lamma Winds and thin film photovoltaic solar system for the HEC; and the landfill gas utilization plant of the South East New Territories Landfill and the Sludge Treatment Facility at Tuen Mun to the grid of the CLP. New potential RE facilities are the proposed Integrated Waste Management Facility in Shek Kwu Chau and a number of Organic Waste Treatment Facilities which will generate biogas in the treatment process for electricity generation or other purposes. We will include these new facilities in our next review of TM when more details are available. We will also follow the mechanism established in the Third TM for ascertaining the emission allowances according to the actual intake of the electricity generated from RE based on the unit emission factors of coal-fired generation units.

THE FOURTH TECHNICAL MEMORANDUM

9. Based on the above review, we propose to promulgate a new TM to allocate the emission allowances from 2019 onwards to each of the existing power plants by the following method, which was also adopted in the compilation of the Third TM:

	Emission allowances to be allocated and ascertained
=	Emission allowances that are required with the use of BPM (i.e., those presented in Table 1 above)
<i>plus/minus</i>	Emission allowances to be added / deducted due to deviation of the actual intake of RE from the anticipated intake (i.e., 2 GWh and 21 GWh for HEC and CLP respectively) in accordance with the unit emission factors of coal-fired generation units

10. The specific formulae for allocating the emission allowances to the four existing electricity works are below:

Table 2(a): Lamma Power Station and Lamma Power Station Extension

	Quantity of Emission Allowance for 2019 and thereafter
SO2	$4\,250 + (2 \text{ ó A}) \times 0.548$
NOx ^[@]	$8\,980 + (2 \text{ ó A}) \times 0.973$
RSP	$200 + (2 \text{ ó A}) \times 0.022$

Table 2(b): Black Point Power Station

	Quantity of Emission Allowance for 2019 and thereafter
SO2	290
NOx ^[@]	4 140
RSP	110

Table 2(c): Castle Peak Power Station

	Quantity of Emission Allowance for 2019 and thereafter
SO2	$4\,678 + (21 \text{ ó B}) \times 0.418$
NOx ^[@]	$12\,358 + (21 \text{ ó B}) \times 1.105$
RSP	$389 + (21 \text{ ó B}) \times 0.035$

Table 2(d): Penny Bay's Gas Turbine Power Station

	Quantity of Emission Allowance for 2019 and thereafter
SO2	2
NOx ^[@]	2
RSP	1

^[@] Expressed as nitrogen dioxide

where -

- A is the aggregate of total net sent-out electricity output (in GWh) from individual RE to the electricity grid of Lamma Power Station and Lamma Power Station Extension in the emission year; and
- B is the aggregate of total net sent-out electricity output (in GWh) from individual RE to the electricity grid of Castle Peak Power Station in the emission year.

11. Similar to the previous three TMs, we will provide 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. We also propose to retain the same mechanism adopted in the Third TM to cater for the possible intake of RE by new electricity works. Accordingly, the formulae for allocating and ascertaining the emission allowances in respect of each of the specified pollutants for possible new electricity works, with respect to the same reference installed capacity adopted in all the three TMs, i.e., 300 MW, for emission years starting from 1 January 2019 would be as follow:

Table 3: New Electricity Works

	Quantity of Emission Allowance for 2019 and thereafter
SO ₂	$90 \times (C/300) \times (D/12) \delta E \times 0.047$
NO _x ^[@]	$250 \times (C/300) \times (D/12) \delta E \times 0.131$
RSP	$7 \times (C/300) \times (D/12) \delta E \times 0.004$

[@] Expressed as nitrogen dioxide

where δ

- C is the total installed capacity (in MW) of the New Electricity Works; or 300 (i.e., reference installed capacity), whichever is smaller;
- D is the total number of months in the emission year after the commencement of operation of the New Electricity Works and part of a month is taken as a full month in the determination; and
- E is the aggregate of total net sent-out electricity output (in GWh) from individual RE to the electricity grid of the New Electricity Works in the emission year.

12. In order to meet electricity demand in the long run and to improve the environment, the Environment Bureau launched in March this year a three-month public consultation on the Future Fuel Mix for Electricity Generation for Hong Kong. The Government has put forward two fuel mix options for public consultation. The first option is "grid purchase", under which importing electricity through purchase from the Mainland power grid (i.e., the China Southern Power Grid) is proposed. The second option is "local generation", under which use of more natural gas for local generation is proposed. Since the findings of the consultation and the decision on the fuel mix in the long run will have significant implications for setting emissions allowances for electricity generation in 2020 and beyond, we will review the TM again in 2015 when the results of the fuel mix review are available.

LEGISLATIVE TIMETABLE

13. The Fourth TM will be published in the Gazette on 17 October 2014 and tabled at the Legislative Council for negative vetting on 22 October 2014. Subject to the negative vetting by the Legislative Council, the new set of emission allowances will take effect at least four years after the commencement of the Fourth TM, i.e., starting from the emission year of 2019 in accordance with section 26G(4) of the Ordinance.

BASIC LAW AND HUMAN RIGHTS IMPLICATIONS

14. The Fourth TM is in conformity with the Basic Law, including the provisions concerning human rights.

ENVIRONMENTAL AND SUSTAINABILITY IMPLICATIONS

15. As compared with the emission allowances for 2017 set under the Third TM, the Fourth TM will see a further tightening of 11% for SO₂, 2% for NO_x and 7% for RSP for the power sector. The reduction will help improve local air quality because emissions from the power sector accounted for 47%, 28% and 16% respectively of the territory-wide emissions of these pollutants in 2012.

16. Achieving better air quality for Hong Kong through statutory control on power plants' emissions is in line with the sustainability principles of seeking opportunities to enhance the quality of our living environment that promotes and protects the physical health of the people of Hong Kong.

TARIFF IMPLICATIONS

17. Attaining the proposed emission caps for 2019 does not involve new capital investment by power companies nor major changes on the fuel mix of power companies. The power companies will present their tariff assessment to the Administration annually in accordance with the prevailing regulatory mechanism under the Scheme of Control Agreement.

FINANCIAL AND CIVIL SERVICE IMPLICATIONS

18. The Fourth TM will not incur additional financial implications for the Administration. Enforcement of the emission caps for power companies will be carried out by existing staff of the Environmental Protection Department (EPD).

CONSULTATION

19. The two power companies have been consulted on the proposal. Both companies consider that the proposed new emission allowances are extremely challenging. They are however committed to working closely with the Administration to ensure compliance while maintaining a reliable supply of electricity to the customers. They also see the compliance of the emission allowances contingent upon having the supply of fuels of the right quality. In the case of CLP, a sufficient supply of natural gas that is of properties consistent with the current level is also important. HEC further explained that with the natural deterioration in the performance of its coal-fired generation units and pollution control equipment, any forced outages of the units or equipment will jeopardize its capability of achieving the new emission targets. Both power companies consider that the proposed emission allowances are very tight. Should their operation encounters events that are beyond their control and with significant emission implications, e.g., cessation or insufficient supply of low emission coal, unexpected increase in power demand, increase in sulphur content of the WEPII gas, etc., they will have to resort to the special event provision under Section 26K of the Ordinance to adjust their emission caps accordingly. EPD will handle these special events in accordance with the Ordinance.

20. The Panel on Environmental Affairs of the Legislative Council was consulted on the new set of emission allowances on 6 October 2014. Members raised no objection to the proposal. Some Panel members were concerned about the tariff impact of any increased use of natural gas for power generation, the affordability of consumers and whether the Administration will consider diversifying the sources of supply of natural gas for power generation in Hong Kong to reduce cost. The Administration explained that the Fourth TM would not increase the share of natural gas for power generation as compared with that in the Second and Third TM. In any case, when the Administration determines the fuel mix in the long run, safety, reliability, environmental performance and price would be the key considerations. As

regards other sources of natural gas, the Administration supports diversification of fuel sources, and will assess the merits of new natural gas supply proposals submitted by the power companies to ensure that the public will continue to enjoy reliable, safe, environmentally friendly and reasonably priced electricity supply.

21. The Advisory Council on the Environment was consulted on the Fourth TM on 13 October 2014. Members supported the proposal.

PUBLICITY

22. A press release will be issued on the date of gazette of the Fourth TM. A spokesman will be made available for media enquiries.

ENQUIRY

23. For any enquiry relating to this brief, please contact Mr. W C Mok, Assistant Director of Environmental Protection (Air Policy), at 3509 8618.

Environmental Protection Department
October 2014

**FOURTH TECHNICAL MEMORANDUM
FOR ALLOCATION OF EMISSION ALLOWANCES
IN RESPECT OF SPECIFIED LICENCES**

WONG Kam-sing
SECRETARY FOR THE ENVIRONMENT

This Technical Memorandum is published under Section 37B(1) of the Air Pollution Control Ordinance (Cap. 311) and shall commence to have effect in accordance with Section 37C of that Ordinance.

TABLE OF CONTENTS

	Page
1. PRELIMINARY	1
1.1 Citation and Commencement	1
1.2 Application and Scope	1
1.3 Interpretation	1
2. ALLOCATION OF EMISSION ALLOWANCES	3

FOURTH TECHNICAL MEMORANDUM FOR ALLOCATION OF EMISSION ALLOWANCES IN RESPECT OF SPECIFIED LICENCES

1. PRELIMINARY

1.1 Citation and Commencement

This Technical Memorandum is the fourth technical memorandum issued pursuant to Section 26G of the Ordinance and may be cited as the "Fourth Technical Memorandum for Allocation of Emission Allowances in Respect of Specified Licences". This Technical Memorandum shall come into operation in accordance with Section 37C of the Ordinance.

1.2 Application and Scope

This Technical Memorandum sets out the quantity of emission allowances for each type of specified pollutant allocated in respect of each specified licence and the allocation principles and determination method of the quantity of emission allowances to be allocated for each and every emission year from 1 January 2019. The allocation of emission allowances set out or determined under the Third Technical Memorandum for each and every emission year from 1 January 2019 is superseded by this Technical Memorandum.

1.3 Interpretation

In this Technical Memorandum, unless the context otherwise requires, the following definitions apply-

"Authority" (監督) has the same meaning as in the Ordinance.

"Electricity Works" (電力工程) means the process of Electricity Works specified in item 7 of Schedule 1 to the Ordinance.

"Emission allowance" (排放限額) has the same meaning as in the Ordinance.

"Emission year" (排放年度) has the same meaning as in the Ordinance.

"Existing Electricity Works" (現有電力工程) means the Electricity Works conducted in any of the following power stations in respect of which a valid specified licence is in force on the commencement date of this Technical Memorandum-

- (a) Lamma Power Station and Lamma Power Station Extension at Lot 1934 and Lot 2200, DD 3, Po Lo Tsui, Lamma Island;
- (b) Black Point Power Station at Yung Long Road, Lung Kwu Tan, Tuen Mun, New Territories;
- (c) Castle Peak Power Station at Lung Yiu Street, Tuen Mun, New Territories; and
- (d) Penny's Bay Gas Turbine Power Station at Lot 23, DD 256, Penny's Bay, Lantau Island, New Territories.

"New Electricity Works" (新電力工程) means any Electricity Works, other than the Existing Electricity Works, which comes into existence after the commencement of this Technical Memorandum.

"Ordinance" (條例) means the Air Pollution Control Ordinance (Cap. 311).

"Electricity generation for local consumption" (供本港使用電力) means the gross electricity generation of the Electricity Works concerned minus the electricity sales for export outside the Hong Kong Special Administrative Region irrespective of whether the export sales are directly conducted by the subject specified licence holder or indirectly dealt with by other dealers.

"Renewable Energy System" (可再生能源系統) means an electricity generation system employing solar, wind, biomass, hydro, tidal, wave, geothermal or energy from waste (including landfill gas or sewage gas) that provides electricity to the grid.

"Third Technical Memorandum" (第三份技術備忘錄) means the "Third Technical Memorandum for Allocation of Emission Allowances in Respect of Specified Licences" published in the Gazette under Section 37B(1) of the Ordinance on 19 October 2012 which came into operation in accordance with Section 37C of the Ordinance.

"Secretary" (局長) has the same meaning as in the Ordinance.

"Specified licence" (指明牌照) has the same meaning as in the Ordinance.

"Specified licence holder"(指明牌照持有人) has the same meaning as in the Ordinance.

"Specified pollutant" (指明污染物) has the same meaning as in the Ordinance.

2. ALLOCATION OF EMISSION ALLOWANCES

2.1 The quantity of emission allowances for each type of specified pollutant allocated to each specified licence of Existing Electricity Works for each and every emission year from 1 January 2019 shall be determined by the formulae in the respective tables as follows-

(a) Lamma Power Station and Lamma Power Station Extension

	2019 and thereafter
Sulphur dioxide	$4\,250 + (2 \text{ ó } A) \times 0.548$
Nitrogen oxides ⁽ⁱ⁾	$8\,980 + (2 \text{ ó } A) \times 0.973$
Respirable suspended particulates	$200 + (2 \text{ ó } A) \times 0.022$

(b) Black Point Power Station

	2019 and thereafter
Sulphur dioxide	290
Nitrogen oxides ⁽ⁱ⁾	4 140
Respirable suspended particulates	110

(c) Castle Peak Power Station

	2019 and thereafter
Sulphur dioxide	$4\,678 + (21 - B) \times 0.418$
Nitrogen oxides ⁽ⁱ⁾	$12\,358 + (21 - B) \times 1.105$
Respirable suspended particulates	$389 + (21 - B) \times 0.035$

(d) Penny's Bay Gas Turbine Power Station

	2019 and thereafter
Sulphur dioxide	2
Nitrogen oxides ⁽ⁱ⁾	2
Respirable suspended particulates	1

⁽ⁱ⁾ Expressed as nitrogen dioxide

where δ

- A is the aggregate of total net sent-out electricity output (in GWh) from the Renewable Energy Systems to the electricity grid of Lamma Power Station and Lamma Power Station Extension in the emission year; and
- B is the aggregate of total net sent-out electricity output (in GWh) from the Renewable Energy Systems to the electricity grid of Castle Peak Power Station in the emission year.

2.2 The quantity of emission allowances for each type of specified pollutant allocated to each specified licence of New Electricity Works for each and every emission year from 1 January 2019 shall be determined by the formulae as follows-

	2019 and thereafter
Sulphur dioxide	$90 \times (C/300) \times (D/12) \delta E \times 0.047$
Nitrogen oxides ⁽ⁱⁱ⁾	$250 \times (C/300) \times (D/12) \delta E \times 0.131$
Respirable suspended particulates	$7 \times (C/300) \times (D/12) \delta E \times 0.004$

⁽ⁱⁱ⁾ Expressed as nitrogen dioxide

where δ

- C is the total installed capacity (in MW) of the New Electricity Works; or 300, whichever is smaller;
- D is the total number of months in the emission year after the commencement of operation of the New Electricity Works and part of a month is taken as a full month in the determination; and
- E is the aggregate of total net sent-out electricity output (in GWh) from the Renewable Energy Systems to the electricity grid of the New Electricity Works in the emission year.

2.3 The Authority shall make the allocation of emission allowances for each type of specified pollutant in relation to each specified licence in respect of electricity generation for local consumption.

2.4 For the purposes of determination of the quantity of emission allowances referred in sections 2.1 and 2.2, the aggregate of the total net sent-out electricity output from the Renewable Energy Systems in the emission year is to be rounded up to the next whole number.

2.5 The quantity of emission allowances determined in this Technical Memorandum for allocation to a specified licence shall be rounded up to the next whole number.

2.6 Unless otherwise provided or required in the Ordinance or its subsidiary legislation, the Authority shall allocate to each specified licence the respective quantity of emission allowances set out or determined in accordance with this Technical Memorandum for each and every emission year from 1 January 2019.

2.7 The Secretary shall review in 2015 the quantity of emission allowances for each type of specified pollutant for each specified licence set out or determined in accordance with this Technical Memorandum after the commencement of this Technical Memorandum.