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Paper for the House Committee meeting on 28 November 2014

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

Purpose

This paper reports on the deliberations of the Subcommittee on Fourth Technical Memorandum for Allocation of Emission Allowances in Respect of Specified Licences.

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 requires the Secretary for the Environment ("SEN") to allocate emission allowances by way of a technical memorandum ("TM") for three specified pollutants, i.e. sulphur dioxide ("SO₂"), nitrogen oxides ("NO_x") and respirable suspended particulates ("RSP") for electricity works.

3. Under section 37B(6) of the APCO, TM is not subsidiary legislation but is required to be published in the Gazette and tabled in the Legislative Council ("LegCo"). Although it is not subsidiary legislation, it is subject to a scrutiny mechanism similar to that provided under section 34 of Interpretation and General Clauses Ordinance (Cap. 1).

4. The First, Second and Third TMs have been issued in 2008, 2010 and 2012 respectively. The First TM sets the emission allowances for the emission years between 2010 and 2014, the Second TM tightens the emission allowances starting from 1 January 2015, and the Third TM further reduces the emission allowances starting from 1 January 2017. Section 2.7 of the Third TM requires SEN to review the emission allowances not less than once every two years after its commencement.

Fourth Technical Memorandum for Allocation of Emission Allowances in respect of Specified Licences (from 1 January 2019)

5. The Fourth TM was gazetted on 17 October 2014 and tabled in LegCo on 22 October 2014. Subject to any amendment by LegCo, 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 APCO.

6. Under the Fourth TM, the proposed emission allowances (in tonnes per year) for the existing electricity works of the two power companies, i.e. the CLP Power Hong Kong Limited ("CLP") and The Hongkong Electric Company, Limited ("HEC"), starting 2019 are set out in the table below –

	SO ₂	NO _x ^[@]	RSP
Hongkong Electric Company, Limited			
Lamma Power Station and Lamma Power Station Extension (mixed fuel)	4 250 [-18%]	8 980 [-5%]	200 [-20%]
CLP Power Hong Kong Limited			
Black Point Power Station (gas-fired)	290 [-80%]	4 140 [-0%]	110 [-0%]
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.

7. Compared with the emission allowances for 2017 set under the Third TM, the Fourth TM will further tighten the emission allowances for SO₂, NO_x and RSP by 11%, 2% and 7% respectively. The Administration will review the Fourth TM in 2015 when the outcome of the public consultation on the Future Fuel Mix for Electricity Generation for Hong Kong ("Fuel Mix Review") is available.

The Subcommittee

8. At the House Committee meeting on 24 October 2014, Members agreed that a subcommittee should be formed to examine the Fourth TM. The membership list of the Subcommittee is in **Appendix**.

9. Under the chairmanship of Hon Cyd HO, the Subcommittee has held one meeting on 5 November 2014 to discuss with the Administration. With members' concurrence, the Chairman has moved a motion at the Council meeting of 12 November 2014 to extend the scrutiny period to 10 December 2014.

Deliberations of the Subcommittee

Attainment of emission caps under the Fourth TM

10. The Subcommittee generally supports the Fourth TM which further reduces the emission allowances for SO₂, NO_x and RSP starting from 2019 as compared with the emission allowances for 2017 under the Third TM. While welcoming the proposed further tightening of the emission allowances to help improve local air quality, some members, including Hon WU Chi-wai and Hon TANG Ka-piu, have expressed concern as to whether the two power companies would be able to attain the proposed emission caps given that there are no major changes in the fuel mix for local electricity generation before the outcome of the Fuel Mix Review launched in March 2014 is announced.

11. The Administration has explained that the Fourth TM would not require the power companies to increase the share of natural gas for power generation as compared with that in the Second and the Third TM. Since a new fuel mix for the long run would not take shape until 2015, the emission allowances for the two power companies in the Third TM and the Fourth TM are broadly determined based on the fuel mix structure adopted in the Second TM, i.e. keeping the share of natural-gas in the fuel mix for local electricity generation close to 50% starting from 2015. In working out the respective emission allowances for 2019, the Administration has taken into consideration the local electricity demand forecast for 2019 and new developments after the setting of the Third TM. For example, the emission reduction efficiency of the emission control devices retrofitted by the power companies has been better than the design level, the natural gas delivered from the West-East Gas Pipeline II ("WEPII") contains less sulphur than the limit prescribed in the supply contract, and the power sector would complete the phasing out of heavy fuel oil by ultra-low sulphur diesel for assisting coal-burning by 2019.

12. On the projected local electricity consumption for 2019 for the two power companies, some members are concerned that additional output from coal-fired generation units to meet electricity demand growth, as in the case of CLP, might ultimately increase power plant emissions. Given that the majority of the existing generation units of the two power companies have been operating for about 30 years, concern is also raised that the natural deterioration of the aging generation units and pollution control equipment might affect their reliability and emission control performance. Any outages of the units or equipment will also jeopardize the two power companies' capability of achieving the new emission targets.

13. The Administration has pointed out that as electricity demand for the Hong Kong Island is forecast to be reduced by around 4% in 2019 as compared to the projection for 2017 when setting the Third TM, the operation of HEC's coal-fired generation units will be reduced, thus providing scope for reducing the emission allowances. As for CLP, although the anticipated 4% increase in electricity generation in 2019 due to demand growth in Kowloon, the New Territories and Lantau has to be met by additional output from its coal-fired generation units, the proposed emission allowances for RSP and NO_x would remain unchanged as compared to the levels in the Third TM as CLP could absorb part of the increase in the emissions of RSP and NO_x by proper maintenance of the emission reduction devices to sustain the prevailing emission control performance. For SO₂, since the natural gas supplied so far via WEPII has a lower sulphur content than the stipulated standard in the supply contract, the emission allowance for SO₂ could be reduced by 4% despite the increase in electricity demand in 2019 as compared with the 2017 levels. Moreover, the emission reduction devices retrofitted in the coal-fired generation units do not have many moving parts and are relatively easy to maintain. As such, their performance would not be affected significantly by normal wear and tear provided that the power companies continued to upkeep good maintenance for the generation units.

14. According to the Administration, although the two power companies consider the proposed new emission allowances very tight and challenging, they are supportive of the Administration's objective to continuously reduce emissions and are committed to working closely with the Administration to ensure compliance while maintaining a reliable supply of electricity to the consumers. The Administration holds the view that with the sustained effort of the two power companies to use low emission coal and to upkeep the performance of the emission control devices while maximizing the use of existing gas-fired generation units and prioritizing the use of coal-fired generation units equipped with advanced emission control devices, both power companies could achieve the proposed emission caps set in the Fourth TM. Should the operation of the two power companies encounter events that are

beyond their control and have 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., the Administration would handle these special events in accordance with section 26K of the APCO and adjust the emission caps as and when necessary.

Tariff implications

15. While appreciating that a price has to be paid for improving the environment and air quality, members are concerned that any increased use of natural gas for power generation and the further tightening of the emission allowances for power plants might have tariff implications. Hon Frankie YICK and some members have raised concern that affordability of the public is not one of the factors of the Government's consideration in making emission allocations under the APCO. Members are of the view that the Administration should strike a proper balance between tightening the emission allowances for power plants and any possible impact on electricity tariff.

16. The Administration has explained that the proposed 2019 emission reduction targets are set with reference to the existing fuel mix and the existing generation units and the advanced emission abatement equipment of the power companies. Since attaining the proposed 2019 emission caps does not involve new capital investment by power companies nor major changes on the fuel mix of power companies, there should be no question of the power companies having to increase electricity tariff in order to meet the tightened emission requirements under the Fourth TM. The Environment Bureau has been monitoring the power companies' generating capacity and investment on generation facilities. The power companies will present their tariff assessment to the Environment Bureau annually in accordance with the prevailing regulatory mechanism under the Scheme of Control Agreements.

17. The Administration has further explained that section 26G(2) of the APCO stipulates that in making emission allocations, SEN should have regard to three considerations, i.e. the best practicable means for preventing the emission of that type of pollutant, whether the emission of that type of pollutant would be, or be likely to be, prejudicial to health, as well as the attainment and maintenance of any relevant air quality objective ("AQO"). According to the Administration, although public affordability is not one of the three considerations provided for in the APCO in making emission allocations, the Administration's energy policy is to ensure that the energy needs of the community are met safely and reliably at reasonable prices while minimizing the environmental impact of electricity generation. Safety, reliability, environmental performance and price would be the key considerations when the Administration determines the fuel mix in the long run to ensure that the public will continue to

enjoy safe, reliable, environmentally friendly and reasonably priced electricity supply.

18. Citing an index published by the University of Hong Kong on the economic cost of air pollution in terms of public health impacts¹, Hon Frankie YICK has pointed out that tightening the emission allowances would help improve local air quality which in turn would promote and protect the physical health of the people of Hong Kong and reduce the overall health care costs of the society. Instead of passing all of the costs of emission reduction to people of Hong Kong, savings in social cost due to the overall reduction in health care costs should be used to offset the possible tariff implications in attaining the tightened emission caps. To reduce the impact on electricity tariff, there is a suggestion that the Administration should consider providing direct funding to the two power companies for investment in new generation units so that no new capital investment by the power companies would be required to attain the tightened emission caps. Sharing Hon YICK's view that the Government should share part of the costs for achieving emission reduction targets, the Chairman urges the Administration to quantify the social cost of air pollution on public health as soon as practicable.

19. The Administration has advised that a local university has been commissioned to develop a method for assessing the cost of air pollution in Hong Kong. Members' concerns could be dealt with more effectively in the context of the formulation of a comprehensive energy policy with reference to the outcome of the Fuel Mix Review having regard to four key factors, namely reliability, safety, price and environmental performance. It is also important to consider the costs and benefits of various measures to improve air quality so that efforts and resources could be deployed effectively.

Diversification of fuel sources

20. The Subcommittee notes that the sulphur content of the natural gas delivered so far from the WEPII is much less than the limit of 200mg/m³ prescribed in the supply contract. As the compliance of the emission allowances is contingent upon having a sufficient supply of natural gas that is of properties consistent with the current level, some members have enquired whether the proposed emission caps worked out with reference to the sulphur content of the natural gas from WEPII would restrict the power companies' choices of procuring natural gas from sources which, though cheaper, have a higher sulphur content.

¹ According to the Hedley Environmental Index published by the School of Public Health, the University of Hong Kong, the total economic loss attributable to air pollution in Hong Kong in 2012 amounted to \$40 billion.

21. As the price of Mainland natural gas supplied to Hong Kong has been on the rise, some members are concerned that over-reliance on Mainland natural gas supply might increase the susceptibility of electricity tariffs to the price volatility of natural gas. Given that the supply of natural gas is not stable and the overall share of natural gas in the combined fuel mix of the two power companies for local electricity generation under the Fourth TM will be about 50%, members have enquired whether the Administration would consider diversifying the sources of supply of natural gas for power generation in Hong Kong with a view to stabilizing the price of natural gas at a reasonable level.

22. The Administration has explained that the sulphur content of natural gas from sources other than WEPII have been taken into consideration when determining the emission allowances under the Fourth TM. The proposed emission caps therefore would not restrict the power companies' choices of supply of natural gas for power generation. The Administration has further highlighted that the Government supports diversification of fuel sources. For natural gas supply, apart from importation through China's WEPII, the two power companies have been importing gas from Yacheng gas field off Hainan Island, as well as liquefied natural gas from Australia and Qatar. The Administration would assess the merits of new natural gas supply proposals submitted by the power companies having regard to relevant factors that would have implications for reliability, safety, environmental performance and price of electricity supply. At members' request, the Administration has provided information on the sulphur content of natural gas from various sources for power generation in Hong Kong.

23. Referring to the safety hazards that nuclear power might pose for Hong Kong, and the proposals for constructing natural gas infrastructure facilities (e.g. liquefied natural gas receiving terminals) in Hong Kong, the Chairman urges the Administration to promote the greater use of renewable energy ("RE") and cleaner fuel instead of increasing the share of nuclear power in the future fuel mix for electricity generation.

24. The Administration has advised that incentives have been provided to the power companies to encourage the development and use of RE². The Administration has examined with the two power companies the feasibility of wide-scale application of RE (e.g. solar power and wind power) in Hong Kong. New potential RE facilities would be developed, such as the proposed Integrated Waste Management Facility in Shek Kwu Chau and a number of Organic Waste Treatment Facilities which would generate biogas for electricity generation.

² The current Scheme of Control Agreements specifies a higher permitted rate of return of 11% for investment in RE infrastructure.

The review in 2015

25. The Subcommittee notes that the Administration plans to conduct in 2015 another review of the emission allowances for electricity generation in 2020 and beyond following the determination of the new fuel mix for power generation in the long run. Some members question whether it is necessary to issue the Fourth TM within 2014, under which the proposed emission caps would be implemented for only one year.

26. The Administration has explained that section 2.7 of the Third TM issued in 2012 requires SEN to review the emission allowances not less than once every two years after its commencement. Section 26G(4) of the APCO also requires a TM to be issued at least four years before the commencement of the emission year in which the new emission allowances take effect. As such, the Administration is required to review the Third TM and work out the new emission allowances for the emission years starting from 1 January 2019 under the Fourth TM. While the Fourth TM would contribute towards further emission reduction for meeting the new AQOs by 2020, the Government has put forward two fuel mix options³ for public consultation in the Fuel Mix Review launched in March 2014. Since the findings of the consultation and the decision on the new fuel mix in the long run will have significant implications for setting of emission allowances for electricity generation in 2020 and thereafter, the Administration will review the Fourth TM in 2015 and explore whether there is room to further tighten the emission caps for power plants when the outcome of the Fuel Mix Review is available.

Setting emission caps for PM2.5

27. The Chairman and some members have raised concern that the emission of PM2.5 from power plants is not regulated in any TM. They question whether imposing caps on the emissions of only SO₂, NO_x and RSP is in line with international practices and enquire about the feasibility of setting emission caps for PM2.5 having regard to the latest international practices.

28. According to the Administration, environmentally advanced countries such as the United States, the European Union, etc. have not set limits on PM2.5 emissions from power plants. As the measurement of PM2.5 in power plant emissions is still under development, it would not be practicable to set limits on PM2.5 emissions at this stage. The Administration has undertaken to monitor closely the relevant developments for reviewing the feasibility for setting such emission caps.

3 The first option is "grid purchase" under which 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.

29. The Administration has explained that as PM_{2.5} is a fraction of RSP (also known as PM₁₀), the emission caps for RSP set in the TM could indeed effectively limit the emissions of PM_{2.5} from power plants. Also, the emission control technologies on particulate matters installed in the major coal generation units in CLP and HEC would also reduce the emissions of PM_{2.5}.

Ozone pollution problem

30. Some members have enquired whether the tightening of emission allowances for power plants would help relieve the ozone pollution problem. The Administration has explained that ozone pollution and haze problem are major air pollution problems in the Pearl River Delta region for which volatile organic compounds and nitrogen oxides are the culprits. Reducing NO_x emission from power plants would help alleviate the ozone pollution problem in the region. The Administration would continue to collaborate with the relevant Mainland authorities to tackle the regional air pollution problems.

Advice sought

31. The Subcommittee has no objection to the issue of the Fourth TM and would not move any amendment to the Fourth TM.

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

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

Membership List

Chairman	Hon Cyd HO Sau-lan, JP
Members	Hon CHAN Hak-kan, JP
	Hon Frankie YICK Chi-ming
	Hon WU Chi-wai, MH
	Hon Gary FAN Kwok-wai
	Hon KWOK Wai-keung
	Hon TANG Ka-piu, JP

(Total : 7 members)

Clerk	Ms Annette LAM
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Legal Adviser	Ms Vanessa CHENG
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