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**Panel on Environmental Affairs**

**Special meeting on 29 September 2015**

**Updated background brief on "Technical Memorandum for Allocation of  
Emission Allowances in respect of Specified Licences"  
prepared by the Legislative Council Secretariat**

**Purpose**

This paper provides updated background information on the development of the Technical Memorandum for Allocation of Emission Allowances in respect of Specified Licences ("TM"), and gives a brief account of the views and concerns expressed by Members on the subject in the 2013-2014 and 2014-2015 legislative sessions.

**Background**

Emission caps for the power sector

2. The Air Pollution Control Ordinance (Cap. 311) ("APCO") empowers the Government to set emission caps for power plants for improving air quality in Hong Kong. Section 26G of APCO provides for the Secretary for the Environment ("SEN") to allocate emission allowances for three specified pollutants, i.e. sulphur dioxide ("SO<sub>2</sub>"), nitrogen oxides ("NO<sub>x</sub>") and respirable suspended particulates ("RSP"), for electricity power plants by way of a TM<sup>1</sup>. Section 26G(2) stipulates that in making emission allocations, SEN should have regard to three considerations, i.e. the best practicable means for preventing the emission of a specified type of pollutant, whether the emission of that type of

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

pollutant would be, or be likely to be, prejudicial to health, as well as the attainment and maintenance of any relevant air quality objective.

Previous Technical Memoranda for Allocation of Emission Allowances in respect of Specified Licences

3. Four TMs were issued in 2008, 2010, 2012 and 2014 respectively. The First TM set the emission allowances for the emission years between 2010 and 2014. The Second TM tightens the emission allowances starting from 1 January 2015 while the Third TM further reduces the emission allowances starting from 1 January 2017. The Fourth TM promulgates the new emission allowances with effect from 1 January 2019<sup>2</sup>. Section 2.7 of the Fourth TM requires SEN to review the emission allowances in 2015.

4. The emission allowances in the Fourth TM were determined with due regard to keeping the share of natural gas in the fuel mix of local electricity generation close to 50%, prioritizing the use of coal-fired generation units equipped with advanced emission control equipment, and using the best practicable means<sup>3</sup> to further reduce the emission allowances under the electricity demand forecast for 2019. As compared with the emission allowances for 2017 set under the Third TM, the emission allowances for 2019 under the Fourth TM will provide for a further tightening by 11% for SO<sub>2</sub>, 2% for NO<sub>x</sub> and 7% for RSP in respect of the power sector.

5. For each of the previous four TMs, the Administration has provided 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<sup>4</sup> 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 Fourth TM also retains the same mechanism adopted in the Third TM to cater for the possible intake of renewable energy ("RE") by new electricity works.

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<sup>2</sup> Under the statutory requirement in section 26G(4) of APCO, an allocation of emission allowances made by a TM in relation to an emission year can only take effect at least four years after the commencement of the TM making the allocation.

<sup>3</sup> When reviewing the Third TM in 2014, the Administration noted that retrofitting the existing generation units with further emission reduction devices was no longer a practicable option to reduce emission because of the extensive retrofit that the two power companies had undertaken in recent years. Besides, the fuel mix for power generation in the long run is being reviewed by the Environment Bureau. The focus of review of the Third TM was thus on further measures that could be introduced as the best practicable means to further reduce the emission allowances under the electricity demand forecast for 2019.

<sup>4</sup> "New electricity works" refers to new entrant that comes into the electricity generation industry after the commencement of a TM.

## Review of fuel mix for power generation

6. With a view to meeting electricity demand in the long run and improving the environment, the Environment Bureau launched in March 2014 a three-month public consultation on the Future Fuel Mix for Electricity Generation for Hong Kong<sup>5</sup>. The Administration has indicated that when reviewing the Fourth TM, it will take into account the findings of the public consultation and the decision on the fuel mix in the long run for setting emission allowances for electricity generation in 2020 and beyond.

## **Deliberations of the Subcommittee**

7. On 6 October 2014, the Panel on Environmental Affairs ("the Panel") was consulted on the review of the Third TM and on the then proposed new TM (i.e. the Fourth TM). A subcommittee of the Legislative Council ("LegCo") was formed in October 2014 to examine the Fourth TM ("the Subcommittee"). Questions relating to emissions from power plants were raised by Members during examination of the Estimates of Expenditure 2015-2016. The major views and concerns expressed by Members are summarized in the ensuing paragraphs.

## Attainment of emission caps under the Fourth TM

8. Members generally supported the Fourth TM as it would further reduce the emission allowances for SO<sub>2</sub>, NO<sub>x</sub> and RSP starting from 2019 as compared with the emission allowances for 2017 under the Third TM. Some Members, however, queried whether the two power companies<sup>6</sup> would be able to attain the prescribed emission caps given that there were no major changes in the fuel mix for local electricity generation.

9. The Administration 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 TMs. Since a new fuel mix for the long run would not take shape until 2015 or later, the emission allowances for the two power companies in the Third and Fourth TMs were broadly determined based on the fuel mix structure adopted in the Second TM,

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<sup>5</sup> Two fuel mix options were put forward for public consultation. The first option is "grid purchase" under which electricity will be imported through purchase from the Mainland power grid (i.e. the China Southern Power Grid). The second option is "local generation" which proposes the use of more natural gas for local generation.

<sup>6</sup> CLP Power Hong Kong Limited and The Hongkong Electric Company, Limited

i.e. keeping the share of natural-gas in the fuel mix for local electricity generation close to 50% starting from 2015.

10. The Administration further advised that, in working out the respective emission allowances for 2019 under the Fourth TM, the Administration had 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 had been better than the design level, the natural gas delivered from the West-East Gas Pipeline II ("WEPII") contained 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.

11. Some Members were concerned that additional output from coal-fired generation units to meet electricity demand growth, as in the case of the CLP Power Hong Kong Limited ("CLP"), might ultimately increase power plant emissions. Given that the majority of the existing generation units of the two power companies had been operating for about 30 years, concern was also raised that the natural deterioration of the aging generation units and pollution control equipment might affect their reliability and emission control performance.

12. The Administration pointed out that as electricity demand for the Hong Kong Island was forecast to be reduced by around 4% in 2019 compared to the projection for 2017 when setting the Third TM, the operation of the coal-fired generation units of The Hongkong Electric Company, Limited ("HEC") would be reduced, thus providing scope for reducing the emission allowances. As for CLP, although the then anticipated 4% increase in electricity generation in 2019 due to demand growth in Kowloon, the New Territories and Lantau had to be met by additional output from its coal-fired generation units, the proposed emission allowances for RSP and NO<sub>x</sub> would remain unchanged compared to the levels in the Third TM since CLP could absorb part of the increase in the emissions of RSP and NO<sub>x</sub> by proper maintenance of the emission reduction devices to sustain the prevailing emission control performance. For SO<sub>2</sub>, since the natural gas supplied so far via WEPII had a lower sulphur content than the stipulated standard in the supply contract, the emission allowance for SO<sub>2</sub> could be reduced despite the increase in electricity demand in 2019. Moreover, as the emission reduction devices retrofitted in the coal-fired generation units did not have many moving parts and were relatively easy to maintain, 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.

13. Members had sought information on the Administration's assessment of the effectiveness of the TMs to reduce emissions from power plants. The Administration advised that according to the emission data in 2013<sup>7</sup>, the emission levels of SO<sub>2</sub>, NO<sub>x</sub> and RSP from the power plants were reduced by 81%, 26% and 60% respectively as compared to 2005<sup>8</sup>. Compared to the emission caps set out in the First TM for 2010, the overall emissions of SO<sub>2</sub>, NO<sub>x</sub> and RSP from the power sector will drop by 63%, 40% and 44% respectively in 2019 and beyond.

#### Scope of emission caps for power plants

14. Noting that Hong Kong's Air Quality Objectives ("AQO")<sup>9</sup> currently covered seven air pollutants (i.e. SO<sub>2</sub>, NO<sub>x</sub>, RSP, fine suspended particulates ("PM2.5")<sup>10</sup>, carbon monoxide, ozone and lead), Members enquired whether the Administration would consider imposing caps on more types of pollutants such as carbon dioxide ("CO<sub>2</sub>") and PM2.5 from power plants. The Administration advised that it was the international practice to set limits on the emission of SO<sub>2</sub>, NO<sub>x</sub> and RSP from power plants, but not CO<sub>2</sub> as there was currently no practicable technology available for controlling CO<sub>2</sub> emission. Reduction in CO<sub>2</sub> emission could only be achieved by adjusting the fuel mix, e.g. increased use of natural gas for electricity generation. The Administration would continue to closely monitor the development of carbon emission technologies relating to power generation with a view to evaluating their suitability for local application.

15. As regards capping the emission of PM2.5, the Administration advised that the emission caps for RSP set in the TMs could effectively limit the emission of PM2.5 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 emission of PM2.5. Since the measurement of PM2.5 for power plants was still under development, it would not be practicable to set limits on PM2.5 emissions at this stage. The Administration would monitor the relevant developments for reviewing the feasibility of setting such emission cap.

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<sup>7</sup> According to the Administration, emission data for the power sector in 2014 were being verified when the relevant information on assessment of the effectiveness of TMs was provided to LegCo in March 2015 for examination of Estimates of Expenditures 2015-2016.

<sup>8</sup> The Administration started in 2005 through specified process licensing mechanism to set emission allowances for power plant emissions.

<sup>9</sup> AQOs are drawn up in accordance with the recommendations of the World health Organization as well as the standards of other advanced places, and updated on 1 January 2014.

<sup>10</sup> PM2.5 is a fraction of RSP (also known as PM10).

### Fuel mix and diversification of fuel sources

16. Since electricity generation was the major emission source of SO<sub>2</sub>, Members enquired whether the two power companies could increase the use of low-sulphur coal under the existing fuel mix structure to further reduce power plant emissions. There was also a suggestion that the Administration should promote a greater use of RE and cleaner fuel instead of increasing the share of nuclear power in the future fuel mix for electricity generation having regard to the safety hazards imposed by nuclear power.

17. The Administration pointed out that while using low-sulphur coal would generate less emission of pollutants, such coal had relatively low electricity output and its burnt residues would accelerate the wear and tear of the mechanical parts of a coal-fired generation unit. In making emission allocations, the Administration would keep abreast of technology development and introduce advanced emission reduction technologies as the best practicable means for reducing the emission of the three specified pollutants. The Administration further advised that incentives had been provided to the power companies to encourage the development and use of RE. The Administration had examined with the two power companies the feasibility of wide-scale application of RE (e.g. solar power and wind power) in Hong Kong, and new potential RE facilities were being or would be developed.

18. As the price of Mainland natural gas supplied to Hong Kong had been on the rise, some Members were concerned that over-reliance on Mainland natural gas supply might increase the susceptibility of electricity tariffs to the price volatility of natural gas. They 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.

19. The Administration explained that apart from importation through China's WEPII, the two power companies had 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.

### Tariff implications

20. Members were concerned that the further tightening of the emission allowances for power plants might have tariff implications. However,



affordability of tariff by the public was not among the factors stipulated in APCO for the Government's consideration of making emission allocations. Members were 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.

21. In view that the tightening of 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, some Members suggested that the Administration should make use of the savings in health care to offset the costs for achieving emission reduction targets, or provide 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.

22. The Administration explained that since attaining the proposed 2019 emission caps did 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. Although public affordability of electricity tariff was not one of the three considerations provided for in APCO in making emission allocations, the Administration's energy policy was to ensure that the energy needs of the community were met safely and reliably at reasonable prices while minimizing the environmental impact of electricity generation.

### **Council question**

23. At the Council meeting on 11 February 2015, Hon CHAN Hak-kan raised a question on "Reduction of air pollutant emissions by power plants". Issues covered in the question included reduction of CO<sub>2</sub> emissions from electricity generation, energy efficiency targets for the power companies, and economic incentives to encourage the use of RE by the power companies. The Council question and the Administration's reply are hyperlinked in the **Appendix**.

### **Latest development**

24. The Administration will brief the Panel on the review of the Fourth TM at the special meeting on 29 September 2015.

**Relevant papers**

25. A list of relevant papers is set out in the **Appendix**.

Council Business Division 1  
Legislative Council Secretariat  
23 September 2015



**Technical Memorandum for Allocation of Emission Allowances  
in respect of Specified Licences**

**List of relevant papers**

<b>Council/ Committee</b>	<b>Date of meeting</b>	<b>Paper</b>
EA Panel	6 October 2014	<p>Administration's paper on "Review of the Third Technical Memorandum for Allocation of Emission Allowances for Power Plants" (<a href="#">LC Paper No. CB(1)2028/13-14(01)</a>)</p> <p>Updated background brief on "Technical Memorandum for Allocation of Emission Allowances in respect of Specified Licence" prepared by the Legislative Council Secretariat (<a href="#">LC Paper No. CB(1)2028/13-14(02)</a>)</p> <p>Minutes of meeting (<a href="#">LC Paper No. CB(1)125/14-15</a>)</p> <p>Administration's supplementary paper (<a href="#">LC Paper No. CB(1)64/14-15(01)</a>)</p>
House Committee	28 November 2014	<p>Report of the Subcommittee on Fourth Technical Memorandum for Allocation of Emission Allowances in Respect of Specified Licences (<a href="#">LC Paper No. CB(1)282/14-15</a>)</p>
Special meeting of the Finance Committee for examination of Estimates of Expenditure 2015-2016	30 March 2015	<p>Written questions raised by Members and Administration's replies (Reply serial numbers: <a href="#">ENB 051 and 392</a>)</p>

**Hyperlink to relevant Council Question:**

<b>Date</b>	<b>Council Question</b>
11 February 2015	Press release on Council question (written) raised by Hon CHAN Hak-kan <a href="http://www.info.gov.hk/gia/general/201502/11/P201502110467.htm">http://www.info.gov.hk/gia/general/201502/11/P201502110467.htm</a>