



## **Advisory Council on the Environment**

### **Comments on the Fifth Technical Memorandum for Allocation of Emission Allowances in Respect of Specified Licenses**

The Advisory Council on the Environment (ACE) discussed the subject on “Review of the Fourth Technical Memorandum (TM) for Allocation of Emission Allowances for Power Plants” at its meeting on 12 October 2015.

The Council was briefed on the legal framework and the best practical means adopted in the review of the Fourth TM for allocation of emission allowances for power plants. Members were supportive of the Government’s proposal to further tighten the emission allowances for the three types of air pollutants, i.e. sulphur dioxide, nitrogen oxides and respirable suspended particulates, by way of issuing the Fifth TM starting from 1 January 2020 under the Air Pollution Control Ordinance, Cap. 311. Members had also made comments and suggestions, in particular on promoting the wider use of renewable energy in the territory, for consideration by the Government. Please refer to the extract of the confirmed minutes of meeting on 12 October as enclosed for details.

13 November 2015

**Confirmed Minutes of the 209<sup>th</sup> Meeting of  
the Advisory Council on the Environment (ACE)  
held on 12 October 2015 at 2:30 pm**

**Present:**

Prof Paul LAM, SBS, JP (Chairman)

Prof CHAU Kwai-cheong, BBS, JP (Deputy Chairman)

Ir Cary CHAN

Prof FUNG Tung

Dr HUNG Wing-tat, MH

Dr Michael LAU

Prof Albert LEE

Ir Prof Irene LO

Ir MA Lee-tak, SBS

Prof John NG

Prof Nora TAM, BBS, JP

Dr Eric TSANG

Dr Carrie WILLIS, SBS, JP

Ir Conrad WONG, BBS, JP

Prof Jonathan WONG, MH, JP

Mr Andrew LAI (Secretary)

**Absent with Apologies:**

Dr Billy HAU

Mr Anthony LOCK

Miss Yolanda NG, MH

Mr Luther WONG, JP

Mr Stanley WONG, SBS, JP

Ms Pansy YAU

**In Attendance:**

Ms Anissa WONG, JP

Permanent Secretary for the Environment / Director  
of Environmental Protection

Mr Simon CHAN

Acting Assistant Director (Conservation),  
Agriculture, Fisheries and Conservation Department  
(AFCD)

Mr Wilson CHAN

Assistant Director of Planning / Technical Services,  
Planning Department (PlanD)

Ms Esther LI

Principal Information Officer, Environmental  
Protection Department (EPD)

Miss Evelyn LEUNG  
Miss Dora CHU  
Ms Daicie TONG

Chief Executive Officer (CBD), EPD  
Executive Officer (CBD), EPD  
Executive Manager (CBD), EPD

**In Attendance for Item 3:**

Mr W C MOK  
Mr Dave HO

Assistant Director (Air Policy), EPD  
Principal Environmental Protection Officer (Air Policy), EPD

Mr Donald NG

Principal Assistant Secretary for the Environment (Electricity Reviews), Environment Bureau (ENB)

Mr Andy HO

Chief Electrical and Mechanical Engineer (Electricity Team) (Acting), ENB

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Action

**Item 3 : Review of the Fourth Technical Memorandum for Allocation of Emission Allowances for Power Plants**

*(ACE Paper 13/2015)*

4. The Chairman said that the paper sought Members' views on the proposal to further reduce emission allowances for power plants in 2020 by way of issuing a new Technical Memorandum (TM) under the Air Pollution Control Ordinance (APCO) (Cap. 311). The discussion would be divided into the Presentation cum Question-and-Answer Session and the Internal Discussion Session. There was no declaration of interest from Members.

*[The presentation team joined the meeting at this juncture.]*

**Presentation cum Question-and-Answer Session (Open Session)**

5. By way of a powerpoint presentation, Mr W C Mok briefed Members on the legal framework and the best practical means (BPM) adopted in the review of the Fourth TM for allocation of emission allowances for power plants, and sought Members' support to the proposal to further tighten the emission allowances for the three specified pollutants, i.e. sulphur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>) and respirable suspended particulates (RSP) by way of issuing a new TM (i.e. the Fifth TM) starting from 1 January 2020 under the APCO. He explained that the following factors had been taken into account –

- (a) progress of implementing the fuel mix plan for 2020, including the

- construction of new gas-fired units to replace some of the old power generation units;
- (b) practicability of maintaining the current import of 80% nuclear output from the Daya Bay Nuclear Power Station after 2018;
  - (c) new technology to control NOx emissions from new gas-fired units; and
  - (d) projected local electricity consumption for 2020.

*Emission caps for the two power companies under the Fifth TM*

6. A Member asked whether the levels of reduction in the emission caps for power plants were commensurate with the 2020 emission reduction targets set out in the "Clean Air Plan for Hong Kong". He also enquired about the feasibility of setting an emission cap for PM2.5 for power plants. Mr W C Mok explained that when setting the 2020 emission reduction targets jointly with Guangdong in 2012, EPD had taken into account a package of air improvement measures targeting at various major local emission sources including power plants, motor vehicles and vessels that were considered to be attainable. In the run up to 2020, new opportunities for emission reduction had emerged such as the International Maritime Organization's plan to tighten the sulphur content of the fuel for ocean-going vessels to 0.5% in 2020 subject to a review in 2018, and that the Daya Bay Nuclear Power Plant might maintain the export of 80% of their nuclear output to Hong Kong beyond 2018. These measures, if implemented, could help attain the emission reduction targets for 2020. Regarding the levels of reduction in emission caps for power plants, Mr Dave Ho explained that the emission caps had been tightened progressively since the First TM. As compared with the emission caps for 2010 under the First TM, the proposed Fifth TM would reduce the emission caps for SO<sub>2</sub>, NOx and RSP from the power sector aggregately by 50% to 69%. Details of the reduction were –

<b>Percentage of emission reduction as compared with the First TM (for 2010-2014)</b>	
Second TM (2015 - 2016)	34 – 50%
Third TM (2017 - 2018)	6 – 17%
Fourth TM (2019 - 2020)	2 – 11%
Fifth TM (2020 onwards)	16 – 17%
<b><i>Aggregate Emission Reduction</i></b>	<b><i>50 – 69%</i></b>

7. As regards the proposal to set an emission cap for PM2.5 for power plants, Mr W C Mok advised that the lack of a reliable measurement method for the

concentration of PM2.5 inside wet stacks made it technically impossible to set a PM2.5 emission cap for power plants. Indeed, other environmentally advanced countries such as the United States had not capped the PM2.5 emissions for their power plants due to this technical constraint. Mr Dave Ho supplemented that as the stacks of local power plants equipped with wet scrubbers to control emissions were saturated with water vapour, water droplets in the flue gas could dissolve some of the PM2.5, rendering these particles not collected by the PM2.5 particle-sizing device for the measurement purpose. Moreover, some PM2.5 were in the form of vapour inside the stack and would condense into particulates after emissions from the stack. These were the challenges that the science community had yet to overcome for the measurement of PM2.5 concentration in a power plant stack saturated with water vapour. Mr Mok assured Members that EPD would continue to closely monitor the development of PM2.5 measurement technology. He also assured Members that control measures to reduce PM10 emissions could also reduce PM2.5 emissions.

8. In response to a Member's concern that power companies might invoke the special event provision under the APCO to absolve their responsibilities of not meeting the emission caps, Mr W C Mok advised that it was a statutory requirement for power companies to meet the emission caps as set out in the APCO. He assured Members that EPD would not lightly adjust the emission caps under the special event mechanism unless the incidents were clearly proven to be beyond the control of power companies and that they had made their best endeavour to avoid such happenings. Mr Mok added that none of the power companies had invoked the special event provision under the previous TMs, and they were obliged to exercise all due diligence to minimize their emissions even after invoking the special event provision.

9. In response to the question from a Member on the performance of low emission coal to reduce power plant emissions by 2020, Mr W C Mok said that low emission coal would generate less SO<sub>2</sub> and NO<sub>x</sub> as compared with normal coal. However, there were limitations on its use as low emission coal had lower heat content thereby requiring larger amount of coal consumption to produce the same amount of electricity. Moreover, low emission coal would cause slagging problems and would accelerate the wear and tear of coal-fired generation units.

10. The Chairman asked why the BPM was prescribed in emission concentration limits instead of total emissions. Mr W C Mok said that the total emission of a pollutant of a generation unit varied with the generation output while

the pollutant concentration would stay at similar levels as long as the emission performance remained the same. It was thus an international practice to use emission concentrations to gauge the performance of generation units. In fact, the total emission of a pollutant could be based on pollutant concentration and the flow rate.

*Development of renewable energy and import of nuclear energy*

11. A Member asked about the incentives for encouraging power companies to use cleaner fuel such as renewable energy (RE) in view of the substantial capital investment involved as well as the efforts in promoting energy saving. Mr Donald Ng informed that the prevailing regulatory mechanism under the Scheme of Control Agreements (SCAs) had stipulated a higher rate of return for investment in RE facilities, i.e. at 11% on their Average Net Fixed Assets as compared to 9.99% permitted rate of return to incentivize the two power companies to develop RE. The Government would take into account comments gathered during the public consultation on the long-term development of the electricity market in Hong Kong conducted earlier this year in considering how to encourage power companies to promote RE, in particular in respect of facilitating access to the power grids by distributed RE generators. On this, the Member suggested that the Government could consider taking up the construction of RE facilities in the form of public works projects and charging power companies only on the operation costs of such facilities. Power companies could hence save substantial capital investments on building these infrastructures which in turn would reflect in the electricity tariff.

12. A Member enquired about the current arrangement on the use of landfill gas as an alternative source of energy and how the emission caps in the new TM would contribute to the reduction of carbon intensity/emission by 2020. Mr Dave Ho said that the landfill gas from the South East New Territories Landfill, which had been considered in the Fourth TM, would be used by a local gas company for local use from 2016 instead of generating surplus electricity to the power grid. Details on the use of landfill gas from the remaining two strategic landfills would be provided for Members' reference after the meeting. Mr Donald Ng added that by implementing the recommended fuel mix for 2020, we should be able to achieve the 50-60% carbon intensity reduction target, which was not included in the TM. EPD

13. A Member suggested that a cost-benefit analysis be conducted on the development of RE viz the benefits and potential savings on public health care expenses so as to better evaluate the strategy/effectiveness of RE development.

He opined that the Government should adopt a broader perspective and draw in support of relevant bureaux/departments in formulating policies for the betterment of the community. The Chairman shared a similar view. Mr Donald Ng advised that there were practical limitations in large-scale development of RE in Hong Kong, e.g. high production costs due to land constraints as well as public acceptance in view of the significant tariff implications. Apart from RE, other fuel sources such as natural gas might help reduce the environmental impact of electricity generation. The fuel mix options included in the earlier public consultation this year and the fuel mix plan formulated with regard to the feedbacks received were drawn up with reference to various considerations, including the local circumstances and physical constraints in developing RE. That said, there was no dispute to the health benefits that might be brought by the more use of RE, and the Government was prepared to promote its adoption subject to the public views on the possible tariff implications.

14. A Member asked about the development of the offshore windfarm in Lamma Island and the one in southeastern waters of Hong Kong, and whether the current import level of nuclear energy from Daya Bay could be further increased. Mr Donald Ng replied that the feasibility study of the windfarm project by the CLP Power Hong Kong Ltd. (CLP) was still underway. While the feasibility study conducted by the Hongkong Electric Company Ltd. (HEC) on their proposed windfarm was more advanced, they had yet to submit a proposal for assessment by the Government. The Government would take into account the feedbacks on RE received during the public consultation on the electricity market development, especially the public's views on whether they were prepared to accept the tariff implications in considering future proposals from power companies in future. As regards the import level of nuclear energy, Mr Ng said that there was limitation to import more nuclear power from the Daya Bay Nuclear Power Plant beyond 80% of its input. It should be noted that the 80% level was just an average figure as Hong Kong was importing more than 90% of Daya Bay's output during the summer peak. Mr W C Mok added that EPD would take into account the latest development of RE facilities in the next TM review.

15. Regarding the Member's follow-up enquiry about the correlation between power plant emissions and impact on public health, Mr W C Mok explained that Hong Kong faced two main air pollution problems, namely roadside air pollution caused by motor vehicle emissions and the regional smog problem. Both would have impacts on public health. To tackle roadside air pollution, the Government had been implementing a series of measures to reduce motor vehicle emissions.

Effort to control emissions from power plants was equally important as their emissions would contribute to the formation of photochemical smog in the Pearl River Delta (PRD) region comprising ozone and fine particulates. He added that the efforts of both Guangdong and Hong Kong Governments in installing flue gas desulphurization and denitrification systems in the PRD region in recent years had borne fruits, with the regional air quality monitoring network recording remarkable reductions in the concentration levels of SO<sub>2</sub> and particulates.

*Fuel mix plan for 2020 and forecast on electricity demand*

16. In answering the enquiry from a Member on whether the forecast on electricity demand was aligned with the projections mentioned in the consultation paper on the electricity market development, Mr Donald Ng advised that the latest projections in the TM made by power companies aligned with those mentioned in the consultation paper on the electricity market with suitable updates made having regard to the latest developments. They were considered to be reasonable.

17. A Member enquired whether revamping the fuel mix was the crucial factor in reducing the emission caps if electricity demand continued to increase in future. Mr W C Mok said that the TMs would be reviewed at least once every two years. Due regard would be given to the BPM and the change in the fuel mix as the latter would reduce our reliance on coal in power generation. For the current review of the Fourth TM, the Government had assessed the emission allowances on the assumption that both HEC and CLP would have new gas-fired generation units, and that CLP would have the additional 10% nuclear power supply from the Daya Bay Nuclear Power Station after 2018.

18. Replying to a Member's question on the drop in the projected electricity demand for Hong Kong Island, Mr Donald Ng said that the Government had introduced a series of energy efficiency and conservation initiatives, e.g. the Building Energy and Efficiency Ordinance which helped reduce the overall electricity consumption in the territory. As there would not be many major infrastructural projects on Hong Kong Island, HEC's estimated drop of electricity consumption of around 4% in 2020 as compared to the demand projection for 2019 made in the Fourth TM was considered reasonable. For CLP, there would be a moderate 1-2% increase forecasted in their local electricity demand in 2020 as compared to that of 2019, which was considered acceptable in view of the new infrastructural projects in the pipeline that might be implemented in CLP's service area during the period.



19. The Chairman thanked the representatives of ENB and EPD for their presentation. He concluded that Members were supportive of the proposed Fifth TM and reiterated Members' concern on the importance of improved air quality from the public health perspective as well as the progressive development and wider use of RE in the territory.

*[The presentation team left the meeting at this juncture.]*