WG Paper 1/2016

For information
on 25 May 2016

AQO Review Working Group

Background of the Air Quality Objectives (AQO) Review

PURPOSE

This paper briefs Members on the background of the AQO review and the latest progress of the implementation of air quality improvement measures.

BACKGROUND

Air Quality Objectives (AQO)

2. The Air Pollution Control Ordinance (APCO) (Chapter 311) stipulates a set of AQO. The Authority shall aim to achieve them as soon as is reasonably practicable and thereafter to maintain the air quality so achieved in order to promote the conservation and best use of air in the public interest.

3. The first set of AQO was established in 1987. Subsequent to the release of a set of Air Quality Guidelines (AQGs) in 2006 by the World Health Organisation (WHO), we commissioned a comprehensive review in 2007 to update the AQO. After a public consultation, the Administration has adopted the current AQO since 1 January 2014. The current AQO (**see Annex A**) comprise seven key air pollutants[1] and are a combination of WHO's Interim Targets (ITs) and AQGs, which serve as an international reference for countries to develop their own air quality standards having regard to their air quality situations as well as social and economic considerations.

4. The ITs are to promote steady progress towards meeting the AQG because of the challenge of achieving the AQG, particularly in more polluted areas. As it is, no countries have fully adopted the AQG as their air quality

[1] The key air pollutants are: sulphur dioxide (SO_2), nitrogen dioxide (NO_2), respirable suspended Particulates (RSP or PM_{10}), fine suspended particulates (FSP or $PM_{2.5}$), carbon monoxide (CO), ozone (O_3) and lead (Pb).

standards. The current AQO are broadly comparable to those adopted by other advanced countries as shown in **Annex B**.

5. When introducing the current AQO, we have also made it a statutory obligation for the Secretary for the Environment (SEN) to review the AQO at least once in every five years and submit to the Advisory Council on the Environment (ACE) a report of the review. As such, we would like to embark on the review now with a view to completing the review by the end of 2017 and the SEN to submit the review report to ACE by mid-2018.

Statutory Roles of Air Quality Objectives

6. The AQO are not merely a set of air quality goals, but also the benchmark for the issuance of environmental permits for designated projects under the Environmental Impact Assessment Ordinance (EIAO) (Chapter 499). In line with the statutory requirement for the Authority to achieve the AQO as soon as is reasonably practicable, compliance with the AQO is a key consideration when the Authority assesses whether the air quality impact of a designated project is acceptable for issuing an environmental permit under the EIAO. Similarly, compliance with the AQO is also considered when the Director of Environmental Protection decides on the licence applications of specified processes such as power plants under the APCO. As such, it is of paramount importance for the review to identify new practicable air quality improvement measures for assessing the scope of tightening the AQO.

Guiding Principles of the Review

7. As in the last review, the guiding principles for conducting this AQO review, having regard to WHO's recommendations and the practices of other advanced countries, are as follows –

(a) the AQO should be set with a view to protecting public health;

(b) the AQO should be updated by benchmarking against the WHO AQG and ITs; and

(c) a progressive approach be adopted in updating the AQO with a view to achieving the WHO AQG as a long-term goal. The pursuit of such goal will be considered with reference to the international practices, the latest technological developments and local circumstances.

8. In our consultation with the Legislative Council Panel of Environmental Affairs and the ACE in March and April 2016 respectively, there were no objections to the continued adoption of these guiding principles for the review.

Key Tasks of the Review

9. In line with the practices of environmentally advanced regions such as the European Union and the United States, key tasks of the AQO review include –

(a) appraising the latest development in respect of air science and the health effects of air pollution;

(b) examining the current air pollution levels and trends, and progress and effectiveness of committed air quality improvement measures;

(c) identifying new practicable air quality improvement measures and conducting cost benefit analysis of the measures;

(d) developing an air quality management plan for further improving air quality; and

(e) assessing air quality under different control scenarios and the scope for further tightening the AQO for recommending a way forward.

PROGRESS OF AIR QUALITY IMPROVEMENT MEASURES

10. In Hong Kong, road transport, navigation and public electricity generation are the major air pollution sources. In 2013[2], they accounted for 97%, 85%, 70% and 72% of our emissions of sulphur dioxide (SO_2), nitrogen

[2] The Hong Kong emission inventory for 2013 is the latest emission inventory available.

oxides (NOx), respirable suspended particulates (RSP) and fine suspended particulates (FSP) respectively. These sources have thus been our main emission reduction targets for better air quality and should be further examined for new scope for emission control in the AQO review. Details of the emission inventory are extracted below –

Pollution Sources	**Emissions of Major Air Pollutants in 2013 (Tonnes)**			
	Sulphur dioxide (SO_2)	**Nitrogen oxides (NOx)**	**Respirable suspended particulates (RSP)**	**Fine suspended particulates (FSP)**
Public Electricity Generation	14,680 (47%)	34,580 (31%)	940 (16%)	430 (9%)
Road Transport	50 (<1%)	25,740 (23%)	1,090 (18%)	1,000 (21%)
Navigation	15,740 (50%)	35,630 (31%)	2,160 (36%)	2,000 (42%)
Civil Aviation	540 (2%)	6,240 (6%)	60 (<1%)	60 (1%)
Other Fuel Combustion	280 (<1%)	11,040 (10%)	850 (14%)	780 (16%)
Non-combustion	N/A	N/A	950 (16%)	480 (10%)
Total	31,280	113,220	6,040	4,740

Notes:
- Figures in parentheses indicate the percentage shares of the air pollutants in different source categories.
- Emission figures are rounded to the nearest ten.
- There may be slight discrepancies between the sums of individual items and the total emissions shown in the table because of rounding.

11. We have indeed been making good progress in implementing the air quality improvement measures targeting these major pollution sources as set out in the "Clean Air Plan for Hong Kong" published in March 2013. These measures will help us broadly attain the AQOs by 2020. There are already signs of air quality improvement.

12. From 2011 to 2015, the ambient concentrations of RSP, FSP, nitrogen dioxide (NO_2) and SO_2 reduced by 19%, 24%, 8% and 23% respectively. During the same period, the roadside concentrations of RSP, FSP, NO_2 and SO_2 reduced by 26%, 21%, 19% and 33% respectively. Only ozone exhibited a rising trend due to the strong influence of regional pollution. The concentration levels of the key air pollutants at the ambient and roadside are set out in **Annex C**.

13. The above improvement is attributed to the implementation of a number of local air quality improvement measures targeting at road and marine transportation, energy efficiency, electricity generation as well as the gradual improvement in air quality in the Pearl River Delta (PRD) region. A summary of major air quality improvement measures is set out in **Annex D**.

14. In 2015, the AQO for SO_2, lead and carbon monoxide were attained while we are still working towards the attainment of the AQO for RSP, FSP, NO_2 and ozone. The status of compliance with the AQO in 2015 is set out in **Annex E**.

15. With the rolling out of more new air quality improvement measures and the collaboration with the Guangdong authorities, we will continue to improve the air quality in Hong Kong with a view to broadly attaining the AQO by 2020.

ADVICE SOUGHT

16. Members are invited to note the contents of this paper.

Environment Bureau / Environmental Protection Department
May 2016

Annex A

Hong Kong's Air Quality Objectives (HKAQO) vs WHO AQGs and Interim Targets

Pollutant	Averaging time	WHO Interim Target-1 ($\mu g/m^3$)	WHO Interim Target-2 ($\mu g/m^3$)	WHO Interim Target-3 ($\mu g/m^3$)	WHO AQGs ($\mu g/m^3$)	Number of Exceedances Allowed under HKAQO
Sulphur Dioxide (SO_2)	10-min	-	-	-	**500**	3
	24-hour	**125**	50	-	20	3
Respirable Suspended Particulates (RSP/PM_{10})	24-hour	150	**100**	75	50	9
	Annual	70	**50**	30	20	Not Applicable
Fine Suspended Particulates ($FSP/PM_{2.5}$)	24-hour	**75**	50	37.5	25	9
	Annual	**35**	25	15	10	Not Applicable
Nitrogen Dioxide (NO_2)	1-hour	-	-	-	**200**	18
	Annual	-	-	-	**40**	Not Applicable
Ozone (O_3)	8-hour	**160**	-	-	100	9
Carbon Monoxide (CO)	1-hour	-	-	-	**30,000**	0
	8-hour	-	-	-	**10,000**	0
Lead (Pb)	Annual	-	-	-	**0.5**	Not Applicable

Note：

Figures in bold and underlined in the above table are Hong Kong's AQO

WHO – World Health Organization

AQG – Air Quality Guidelines

Annex B

Air Quality Standards in Other Countries

Pollutant	Avg. Time	WHO AQGs (ITs)	Hong Kong		China	USA	EU	
		Conc. (ug/m^3)	Conc. (ug/m^3)	No. of Ex./ yr	Conc. (ug/m^3)	Conc. (ug/m^3)	Conc. (ug/m^3)	No. of Ex./ yr
Sulphur Dioxide (SO_2)	10 min	500	500 (WHO AQG)	3	-	-	-	-
	1-hr	-	-	-	500	196 [3]	350	24
	24-hr	20 (IT-1: 125, IT-2: 50)	125 (IT-1)	3	150	-	125 (IT-1)	3
	Annual	-	-	-	60	-	-	-
RSP (PM_{10})	24-hr	50 (IT-1: 150, IT-2: 100, IT-3: 75)	100 (IT-2)	9	150 (IT-1)	150 (IT-1) [4]	50 (WHO AQG)	35
	Annual	20 (IT-1: 70, IT-2: 50, IT-3: 30)	50 (IT-2)	N/A	70 (IT-1)	-	40	N/A
FSP ($PM_{2.5}$)	24-hr	25 (IT-1: 75, IT-2: 50, IT-3: 37.5)	75 (IT-1)	9	75 (IT-1)	35 [5]	-	-
	Annual	10 (IT-1: 35, IT-2: 25, IT-3: 15)	35 (IT-1)	N/A	35 (IT-1)	12 [6]	25 (IT-2)	N/A
Nitrogen Dioxide (NO_2)	1-hr	200	200 (WHO AQG)	18	200 (WHO AQG)	188 [3]	200 (WHO AQG)	18
	24-hr	-	-	-	80	-	-	-
	Annual	40	40 (WHO AQG)	N/A	40 (WHO AQG)	100	40 (WHO AQG)	N/A
Ozone (O_3)	1-hr	-	-	-	200	-	-	-
	8-hr	100 (IT: 160)	160 (IT)	9	160 (IT)	137 [1]	120	25 [2]
Carbon Monoxide (CO)	1-hr	30,000	30,000 (WHO AQG)	-	10,000	40,000	-	-
	8-hr	10,000	10,000 (WHO AQG)	-	-	10,000 (WHO AQG)	10,000 (WHO AQG)	-
	24-hr	-	-	-	4,000	-	-	-
Lead (Pb)	3-mth	-	-	-	1.5	0.15	-	-
	annual	0.5	0.5 (WHO AQG)	N/A	1	-	0.5 (WHO AQG)	N/A

Notes: [1] Annual fourth-highest daily max. 8-hour concentration, averaged over 3 years.

[2] 25 days per calendar year, averaged over 3 years.

[3] 98^{th} percentile (for NO_2) or 99^{th} percentile (for SO_2) of 1-hour daily maximum concentrations, averaged over 3 years.

[4] Not to be exceeded more than once per year on average over 3 years.

[5] 98th percentile, averaged over 3 years.

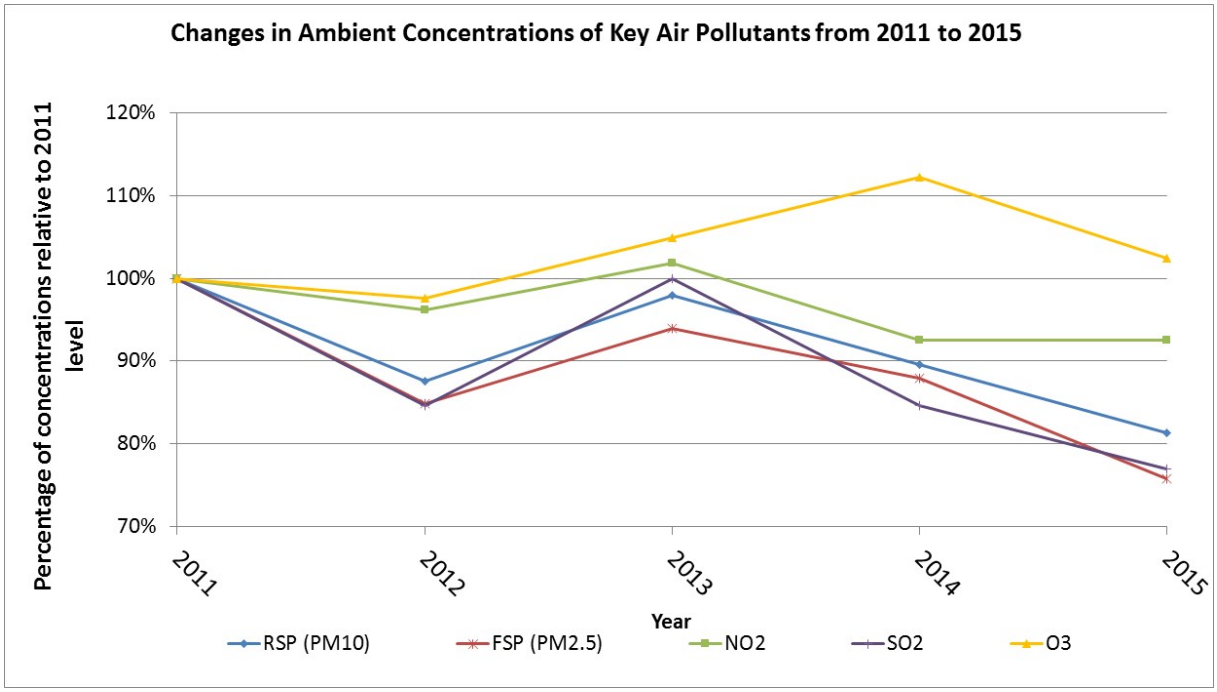
[6] Annual mean, averaged over 3 years.

Annex C

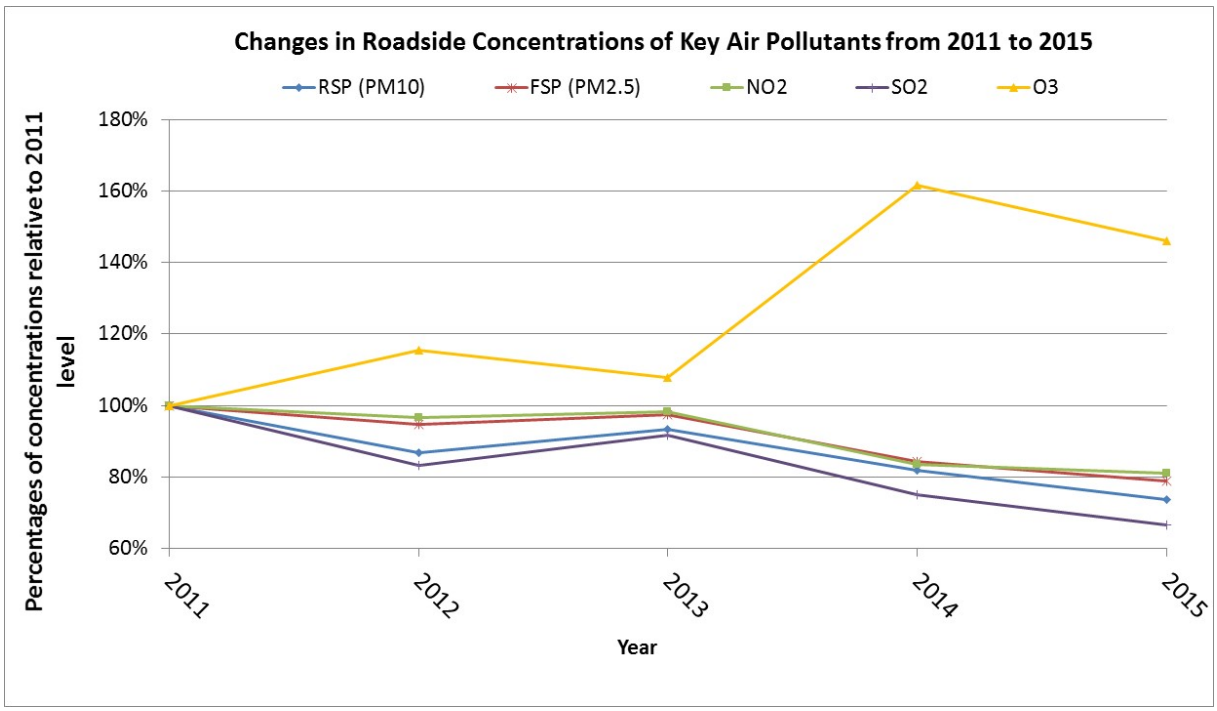
Annual Average Concentration of Key Air Pollutants from 2011 to 2015 (in µg/m^3)

Air Quality Monitoring Station		2011	2012	2013	2014	2015	**Change between 2011 and 2015**
RSP (PM_{10})	General	48	42	47	43	39	**-19%**
	Roadside	61	53	57	50	45	**-26%**
FSP ($PM_{2.5}$)	General	33	28	31	29	25	**-24%**
	Roadside	38	36	37	32	30	**-21%**
NO_2	General	53	51	54	49	49	**-8%**
	Roadside	122	118	120	102	99	**-19%**
SO_2	General	13	11	13	11	10	**-23%**
	Roadside	12	10	11	9	8	**-33%**
O_3	General	41	40	43	46	42	**2%**
	Roadside	13	15	14	21	19	**46%**

Air Quality Trend at General Stations



Air Quality Trend at Roadside Stations



Annex D

Summary of Major Air Quality Improvement Measures

Improving Roadside Air Quality

Tailpipe emissions are the key source of air pollution at the roadside though regional background ozone and particulates levels also have a bearing. To improve roadside air quality, we have introduced a number of measures targeting at pre-Euro IV diesel commercial vehicles (DCVs), petrol and liquefied petroleum gas (LPG) vehicles, and franchised buses. Key measures include the incentive-cum-regulatory scheme to progressively phase out some 82 000 pre-Euro IV DCVs by the end of 2019, deploying mobile roadside remote sensing equipment to detect LPG and petrol vehicles with excessive emissions, retrofitting Euro II and III franchised buses with selective catalytic reduction devices (SCRs) to upgrade their emission performance and promoting a wider use of hybrid and electric vehicles (EVs).

Phasing out Pre-Euro IV DCVs

2. The response to the incentive-cum-regulatory scheme has been very encouraging since its launch in March 2014. As at end of April 2016, about 41 700 pre-Euro IV DCVs or 51% of the eligible pre-Euro IV DCV participated in the ex-gratia payment scheme and retired. All eligible pre-Euro DCVs had been phased out by 31 December 2015. We shall continue to implement the scheme and encourage owners to phase out their DCVs before the deadlines stipulated below.

Emission Design Standard of DCVs	Deadlines for application for ex-gratia payment
Euro I	December 31, 2016
Euro II	December 31, 2017
Euro III	December 31, 2019

Strengthened Emission Control of LPG and Petrol Vehicles

3. From September 2014 to end of April 2016, our roadside remote sensing devices checked some 1 040 000 vehicle counts. About 6 100 Emission Testing Notices were issued to vehicle owners concerned requiring them to have their vehicles repaired and passed an emission test with the aid of a chassis dynamometer at a Designated Vehicle Emission Testing Centre within 12 working days. Vehicles that failed the emission test will have their licences cancelled. As at end of April 2016, the Transport Department cancelled licences of about 280 vehicles for failing to pass the emission test. The strengthened control has helped to reduce the number of taxis and light buses with excessive emissions from over 80% before the control regime to about 10%, 15 months after implementation.

Retrofitting Euro II and III franchised buses with selective catalytic reduction devices

4. The franchised bus companies are fully subsidized by the Government to retrofit eligible Euro II and III franchised buses with SCRs to upgrade their emission performance to that of Euro IV or above level. As at end of April 2016, about 360 eligible franchised buses have been retrofitted with SCRs. Our target is to complete the entire retrofit programme by the end of 2017.

Promoting the use of green transport technologies

5. The Government has been taking the lead in promoting a wider use of EVs and working with the private sector in expanding the charging network. As at end of April 2016, there were 5 289 EVs in Hong Kong, up from 96 in end 2010. 247 EVs are in the Government fleet. There are currently over 1 300 public chargers across the territory, including 239 medium chargers, 15 CHAdeMO quick chargers and 145 quick chargers of other charging standards. The First Registration Tax for EVs has been waived since 1994 and the current exemption will last until 31 March 2017.

6. The trial run of six double-deck hybrid buses is in progress as they

have commenced operation by end 2014 on six bus routes. Five single-deck electric buses have been put into service since end of 2015. The remaining 31 electric buses would be put into service progressively in 2016. These trials will last for two years, with an interim review to be conducted about one year after the commencement of trial.

7. As at end of April 2016, the Pilot Green Transport Fund approved 87 trials with a total subsidy of about $88 million to test out various innovative transport technologies including electric vehicles and hybrid vehicles. We have uploaded the results of the trials on EPD's website to encourage the trades to adopt these new technologies.

Marine Emission Control

8. Marine vessels are the largest contributor of local emissions, accounting for 50% and 36% of the SO_2 and RSP emissions respectively in 2013. To reduce their emissions, we have introduced cleaner fuels for the marine sector.

9. Since 1 April 2014, we imposed a statutory cap of 0.05% on the sulphur content of locally supplied marine diesel. This measure can help reduce the SO_2 and RSP emissions from local vessels by 90% and 30% respectively.

10. Since 1 July 2015, ocean-going vessels (OGVs) have been required to switch to low sulphur fuel (with a sulphur content not exceeding 0.5%) while berthing in Hong Kong. Hong Kong is the first port in Asia to mandate the fuel switch at berth. This measure can help reduce the SO_2 and RSP emissions from OGVs at berth by 60%.

11. Since the implementation of the regulation, we have seen notable reduction in the concentrations of SO_2 in the vicinity of container terminals and other port areas. For example, when the wind was blowing from the container terminals, the average SO_2 concentration recorded at Kwai Chung air quality monitoring station had been reduced by around 50% after the

implementation of the regulation in 2015 as compared with the average of 2010 to 2014.

Non-road Mobile Machinery

12. Starting from 1 June 2015, all Non-road Mobile Machinery (NRMMs) newly supplied for use in Hong Kong are required to comply with the emission standards stipulated in the Air Pollution Control (NRMM) (Emission) Regulation (Cap. 311Z). The emission standards for regulated machines including crawler cranes, gantry cranes, air compressors, excavators, etc. are set at European Union (EU) Stage IIIA level, while those for non-road vehicles, such as internal vans and trucks in the airport and port facilities, are the same as the prevailing statutory emission standards for vehicles seeking first registration (currently at Euro V emission standards).

13. Starting from 1 December 2015, only approved or exempted NRMMs with proper labels shall be used in specified activities such as the airport, port facilities, construction sites, designated waste disposal facilities and specified processes as stipulated in Schedule 1 of the APCO.

14. Regulated machines in use in Hong Kong before the enactment of the Regulation are predominantly at EU Stage I level emission standards. Comparing with those existing machines, NRMMs complying with the EU Stage III A will emit about 60% less for both nitrogen oxides (NOx) and RSP. The control also helps reduce environmental nuisance caused by NRMMs to the residential areas close to container terminals and construction sites.

Energy Efficiency Measures

Building Energy Codes

15. The Buildings Energy Efficiency Ordinance (BEEO) took effect on 21 September 2012. On 11 December 2015, the 2015 editions of the Code of Practice for Energy Efficiency of Building Services Installation and Code

of Practice for Building Energy Audit were gazetted.

16. The Code of Practice for Energy Efficiency of Building Services Installation specifies the energy efficiency standards and requirements for four key types of building services installations, namely air-conditioning, lighting, electrical, and lift and escalator installations. The Code of Practice for Building Energy Audit sets out the technical requirements and details in respect of the energy audit under the BEEO. Both Codes are subject to review once every three years.

17. The new energy efficiency standards stipulated in the 2015 version are more stringent than the 2012 version, with about 10% improvement in energy efficiency.

Mandatory Energy Efficiency Labelling Scheme

18. Phase I and Phase II of the Mandatory Energy Efficiency Labelling Scheme (MEELS) were fully implemented in 2009 and 2011 respectively, covering five types of prescribed products, namely room air conditioners, refrigerating appliances, compact fluorescent lamps, washing machines (washing capacity $\leq$ 7kg) and dehumidifiers. Under the MEELS, energy labels are required to be shown on the prescribed products for supply in Hong Kong to inform consumers of their energy efficiency performance. Importers or local manufacturers shall apply for the reference numbers of energy labels for their prescribed products by submitting the product information, including test reports of the product models, to the Electrical and Mechanical Services Department to demonstrate compliance with the energy efficiency requirements before the prescribed products are supplied in Hong Kong.

19. Starting from 25 November 2015, energy efficiency grading standards for room air conditioners, refrigerating appliances and washing machines had been tightened. Products bearing a Grade 1 energy label under the new grading standards are about 10 to 45% more energy efficient than those under the past standards.

20. In order to capture further energy saving potential, we will expand the scope of the MEELS to include the following five types of products under the proposed Phase III: (a) televisions; (b) electric storage water heaters; (c) induction cookers; (d) washing machines (7kg < washing capacity ≤ 10kg); and (e) room air conditioners (heat pump). We will prepare the relevant legislative amendments for submission to the Legislative Council within the 2016-17 legislative year.

District cooling system for Kai Tak Development

21. The district cooling system for Kai Tak Development produces chilled water at its central chiller plants and distributes the chilled water to user buildings in Kai Tak Development through an underground water piping network. Given its high energy efficiency, which is about 35% more energy-efficient than traditional air-cooled air-conditioning system, it can contribute to air quality improvement and low carbon economy.

22. District cooling services have been provided progressively since February 2013 to the Kai Tak Cruise Terminal building, Ching Long Shopping Centre under the Hong Kong Housing Authority, Trade & Industry Tower and two primary schools.

Emission Control on Electricity Generation

23. Electricity generation is one of the major local sources of air pollution. We have been progressively tightening emission caps of power plants via the promulgation of Technical Memorandum (TM) issued under the APCO. We issued the Fifth TM in December 2015 to further tighten the emission caps from 2020 onwards. Compared to the emission caps for 2010 under the First TM issued in 2008, the emission caps for SO_2, NOx and RSP in the Fifth TM will be further reduced by 50% to 69%.

24. The Government launched a public consultation on revamping the future fuel mix for electricity generation in March 2014. Having regard to

the views and comments received, we plan to increase the share of natural gas electricity generation to around 50% of the total fuel mix in 2020. Nuclear import will account for around 25% of the total fuel mix. We are prepared to develop more renewable energy and enhance our efforts to promote demand side management, and the remaining demand will be met by coal-fired generation.

Regional Collaboration

25. In addition to reducing emissions from local sources, we have been working closely with the Guangdong (GD) Provincial Government to improve the air quality of the Pearl River Delta (PRD) region. Over the past years, GD has implemented a wide range of measures to reduce emissions in the PRD region, such as requiring coal-fired power plants to install flue-gas desulphurization and denitrification devices, tightening the vehicle emission standards and fuel standards, phasing out highly polluting industrial facilities, etc.

Air Quality in PRD region

26. The air quality in the PRD region has been improving. From 2006 to 2015, the concentration levels of three key air pollutants, namely, SO_2, NO_2 and RSP in the PRD region decreased by 72%, 28%, and 34% respectively. Nevertheless, the ozone concentration increased by 10% in the same period, indicating a deterioration in smog pollution in the PRD region.

Annual Average Concentration of Key Air Pollutants in the PRD Region from 2006 to 2015(in $\mu g/m^3$)

Pollutant	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2015 vs 2006**
RSP (PM_{10})	74	79	70	69	64	64	56	63	56	49	**-34%**
SO_2	47	48	39	29	25	24	18	18	16	13	**-72%**
NO_2	46	45	45	42	43	40	38	40	37	33	**-28%**

Pollutant	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2015 vs 2006
O_3	48	51	51	56	53	58	54	54	57	53	**10%**

Emission Reduction Targets for 2015 and 2020

27. In November 2012, both Governments agreed to set emission reduction targets for four key air pollutants, namely SO_2, nitrogen oxides (NOx), RSP and volatile organic compounds (VOCs) in Hong Kong and the PRD region for 2015 and 2020 as set out in the table below. Both governments have been implementing a host of emission reduction measures for achieving the emission reduction targets. We are now conducting a joint mid-term review with the GD government with a view to concluding the emission reductions for 2015 and finalizing the emission reduction targets for 2020. The review is expected to be completed in 2017.

Emission Reduction Targets for Hong Kong and the PRD Region for 2015 and 2020

Pollutant	Area	2015 Emission Reduction Target* (%)	2020 Emission Reduction Range* (%)
SO_2	Hong Kong	-25%	-35% ~ -75%
	PRD Economic Zone	-16%	-20% ~ -35%
NOx	Hong Kong	-10%	-20% ~ -30%
	PRD Economic Zone	-18%	-20% ~ -40%
RSP (PM_{10})	Hong Kong	-10%	-15% ~ -40%
	PRD Economic Zone	-10%	-15% ~ -25%
VOC	Hong Kong	-5%	-15%
	PRD Economic Zone	-10%	-15% ~ -25%

*as compared with 2010 emission levels

PRD Marine Emission Control Area

28. In December 2015, the Ministry of Transport (MoT) issued an implementation plan for controlling marine emissions in three major regions

in the Mainland including the PRD region. Under the plan, a marine emission control area (ECA) will be established in the PRD waters requiring OGVs to switch to low sulphur fuel (with sulphur content not exceeding 0.5%) while at berth in PRD ports progressively from 2017. By 2019, all OGVs in the ECA are required to use low sulphur fuel. We will collaborate with MoT and GD authorities on the setting up of the ECA which will further reduce emissions from OGVs in the PRD region.

Annex E

Compliance Status of Air Quality Objectives in 2015

Pollutants	Averaging time	Air Quality Objectives		Compliance Status[1]	
		Concentration Limit Value ($\mu g/m^3$)	Number of Exceedances Allowed	General Station[3]	Roadside Station
Sulphur Dioxide	10-min	500	3	Yes	Yes
	24-hour	125	3	Yes	Yes
Respirable Suspended Particulates (RSP/PM_{10})	24-hour	100	9	No (maximum number of exceedance up to 18)	No (maximum number of exceedance up to 11)
	Annual	50	Not Applicable	Yes	No (maximum level up to 55$\mu g/m^3$)
Fine Suspended Particulates ($FSP/PM_{2.5}$)	24-hour	75	9	No (maximum number of exceedance up to 11)	No (maximum number of exceedance up to 10)
	Annual	35	Not Applicable	Yes	No (maximum level up to 37$\mu g/m^3$)
Nitrogen Dioxide	1-hour	200	18	No (maximum number of exceedance up to 67)	No (maximum number of exceedance up to 460)
	Annual	40	Not Applicable	No (maximum level up to 64$\mu g/m^3$)	No (maximum level up to 106$\mu g/m^3$)
Ozone	8-hour	160	9	No (maximum number of exceedance up to 24)	Yes[2]
Carbon Monoxide	1-hour	30,000	0	Yes	Yes
	8-hour	10,000	0	Yes	Yes
Lead	Annual	0.5	Not Applicable	Yes	Yes

Note:-

(1) An AQO is not in compliance with if any of the general or roadside stations fails to meet that AQO.

(2) Roadside ozone level is usually low due to its rapid reaction with nitrogen oxides emitted from vehicles

(3) Tap Mun station was temporary closed down in Dec. 2015 due to roof maintenance works.