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

Supplementary Information

The information requested by Members at the Subcommittee meeting on 5 November 2014 is as follows –

(a) the respective number and years of service of existing gas-fired and coal-fired generation units of The Hongkong Electric Company, Limited and CLP Power Hong Kong Limited, and whether all the units are included in the net asset value for calculating the ceiling of the permitted return of the two power companies.

CLP's Power Hong Kong Limited (CLP)

CLP has 8 coal-fired generation units and 8 gas-fired generation units. Details are –

Station	Coal-fired Generation Units		
	Unit Name	Capacity (MW)	Commissioning Year
Castle Peak	A1	350	1982
	A2	350	1983
	A3	350	1984
	A4	350	1985
	B1	677	1986
	B2*	677	1987
	B3*	677	1988
	B4	677	1990
Total Capacity		4,108	
Note * B2 and B3 can also burn gas.			

Station	Gas-fired Generation Units		
	Unit Name	Capacity (MW)	Commissioning Year
Black Point	C1	312.5	1996
	C2	312.5	1996
	C3	312.5	1996
	C4	312.5	1996

Station	Gas-fired Generation Units		
	Unit Name	Capacity (MW)	Commissioning Year
	C5	312.5	1997
	C6	312.5	1998
	C7	312.5	2005
	C8	312.5	2006
Total Capacity		2,500	

All the above units are included in the net asset value for calculating the permitted return of CLP.

Hong Kong Electric Company Limited (HEC)

HEC has 8 coal-fired generation units and 2 gas-fired generation units. Details are –

Station	Coal-fired Generation Units			Gas-fired Generation Units		
	Unit Name	Capacity (MW)	Commissioning Year	Unit Name	Capacity (MW)	Commissioning Year
Lamma	L1	250	1982	GT57CC	365	1990 [a]
	L2	250	1982	L9	335	2006
	L3	250	1983			
	L4	350	1987			
	L5	350	1988			
	L6	350	1992			
	L7	350	1995			
	L8	350	1997			
Total Capacity		2,500			700	

Note [a]: GT57CC is a combined cycle gas-fired generation unit commissioned in 1990. Its generators and associated electrical plants were taken from two oil-fired generation units in Ap Lei Chau Power Station that were commissioned in 1973 and 1975 respectively.

All the above units are included in the net asset value for calculating the permitted return of HEC.

(b) the comparison of the proposed emission control under the Fourth Technical Memorandum for Allocation of Emission Allowances in Respect of Specified Licences with emission control for power plants in other environmentally advanced countries.

With proper operation and maintenance, power generation units in general have useful life of up to 30-40 years. All the generation units of the two power companies covered by the Fourth Technical Memorandum (TM) are existing units, many of which were built in 1980s and 1990s when advanced emission control equipment such as flue gas desulphurization (FGD) or selective catalytic reduction (SCR) had yet to be considered as the best practicable means (BPM) for emission reduction. While it is possible in theory to bring down their emissions through retrofitting them with advanced emission control equipment, the feasibility of this means could be limited by the space available in individual power plants and the remaining serviceable life of the generation units. The diverse conditions of the plants make it inappropriate to compare the emission performance of local generation units with that of generation units in other countries on an emission per electricity generation basis. Instead, the comparison should be made on the extent of adoption of the advanced emission control technologies. .

In the case of setting the Fourth TM, we noted that there is no scope for further retrofit because of the extensive retrofit that had been undertaken in recent years. Besides, it is worthwhile to note that the use of cleaner fuel will be maximized in the coming years and the generation units will have to be properly maintained. The remaining issue is whether the retrofitted best practicable means for emission reduction are comparable with those prevailing in environmentally advanced countries.

The BPM in Hong Kong is known as the “Best Available Techniques (BAT)” in the European Union (EU) and the “Best Available Control Technology (BACT)” in the United States (US). Ours are essentially the same as those of EU and US. Details are summarized in the table below –

Pollut-ant	Commonly used emission control requirements		
	BPM (Hong Kong)	BAT (EU)	BACT (US)
Coal fired generation units			
SO_2	● use of low sulphur coal ● FGD	● use of low sulphur coal ● FGD	● use of low sulphur coal ● FGD
NOx	● low NOx burners ● over fire air ● SCR	● low NOx burners ● over fire air ● SCR; or other reduction devices	● low NOx burners ● over fire air ● SCR; or other reduction devices
Particulates	● electrostatic precipitators ● FGD	● electrostatic precipitators; or fabric filter in conjunction with spray dry scrubber technique ● wet scrubber techniques such as FGD	● electrostatic precipitators; or fabric filter in conjunction with spray dry scrubber technique ● wet scrubber techniques such as FGD
Natural gas fired generation units			
SO_2	● use of natural gas	● use of natural gas	● use of natural gas
NOx	● low NOx burner ● SCR (for new installation)	● low NOx burner ● SCR	● low NOx burner ● SCR
Particulates	● good combustion and use of natural gas	● good combustion and use of natural gas	● good combustion and use of natural gas

(c) information on the sulphur content of natural gas from various sources for power generation in Hong Kong.

In general, liquefied natural gas (LNG) has negligible sulphur content because the liquefaction could reduce its sulphur content. Compressed natural gas (CNG) has a relatively higher sulphur content and the level varies from source to source.

Among the two power companies, HEC uses LNG from Australia and Qatar. The sulphur content is negligible.

In the case of CLP, its natural gas is CNG supplied through pipelines from two sources, namely the Yacheng gas field and the Second West-East Natural Gas Pipeline (WEPII). The sulphur content of Yacheng gas is around 40 mg/m^3. The sulphur content of WEPII gas has so far been around 15 mg/m^3 since its commissioning in mid-2013 despite the sulphur content ceiling being stipulated in the supply contract is 200 mg/m^3. To allow for fluctuations in the quality of gas in future, we have made reference to the sulphur content of Yacheng gas in setting the emission allowance for the gas-fired units for CLP in the Fourth TM. As such, it would not be an undue restriction on power companies for sourcing its natural gas for power generation.

Environmental Protection Department
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