China

Mainland China

China implemented the Environmental Protection Law in 1989. It established the framework for protecting the environment, including setting standards, assessing (and limiting) environmental impacts, fines for pollution, and bans on polluting technologies/facilities. The emission standards are published on the Chinese Environmental Standards Net at http://www.es.org.cn/. The emission limit values for air pollutants from coal combustion are given in GB13223-2011 (*Emission Standard for Air Pollutants from Thermal Power Plants*, available from http://www.es.org.cn/siteadmin/File/StdView.php?bzlistID=1193) and GB13271-2001 *(Emission Standard for Air Pollutants from Coal-burning, Oil-burning, and Gas-fired Boilers*, available from http://www.es.org.cn/siteadmin/File/StdView.php?bzlistID=584).

Emission standards for air pollutants from coal-fired power plants (GB13223-2011)

The Emission Standard for Air Pollutants from Thermal Power Plants (GB13223-2011) came into force on 1 January 2012, replacing GB13223-2003. It applies to all pulverised coal combustion power generating boilers, and all coal-fired power generating boilers with a unit capacity greater than 65 tonnes/hour (t/h), except for stokers. Gangue-fired power generating units with a capacity of over 65 t/h should meet the emission standards for circulating fluidised bed (CFB) thermal power generating boilers. The gas turbines of integrated coal gasification combined cycle (IGCC) power generating units should meet the emission limit values for natural gas-fired turbines.

Pollutant	Application	Emission Limit value	Location of monitoring and emissions control
particulate, mg/^{3}	all	30	stack and flue
SO_2, mg/m^3	new boilers	100	stack and flue
		200[a]	
	existing boilers	200	
		400[a]	
NOx (as NO_2), mg/m^3	all	100	stack and flue
		200[b]	
mercury and mercury compounds, mg/m^3	all	0.03	stack and flue
opacity (Ringelmann smoke chart)	all	1	stack vent

[a] Emission limits apply to plants in Guangxi Zhuang Autonomous Region, Chongqing Municipality, Sichuan Province and Guizhou Province.

[b] Emission limit applies to arch fired furnaces, existing CFB power generating boilers, and power generating boilers commissioned or which received approval for construction before 31 December 2003.

Notes:

Existing thermal power generating boilers should meet the emission limit values for particulate, sulphur dioxide, nitrogen oxides and opacity from 1 July 2014.

New thermal power generating boilers should meet the emission limit values for particulate, sulphur dioxide, nitrogen oxides and exhaust gas opacity from 1 January 2012.

Coal-fired boilers should meet the emission limit values for mercury and mercury compounds from 1 January 2015.

Special air pollutant emission control requirements for key regions

Coal-fired power plants located within the key regions should meet the special emission limit values in the following table. The key regions include Beijing City, Tianjin City, Hebei Province, Yangzi River Delta, Pearl River Delta, Central Liaoning Province, Shandong Province, Wuhan City and surrounding areas, Changsha City, Zhuzhou City, Xiangtan City, Chengdu and Chongqing City, coastal areas of Fujian Province, Central and Northern Shanxi Province, Guanzhong Region of Shaanxi Province, Gansu Province, Ningxia Province, and Wulumuqi (Ürümqi, Xinjiang Uyghur Autonomous Region).

Pollutant	Application	Emission limit value	Location of monitoring and emissions control
particulate, mg/m^3	all	20	stack and flue
SO_2, mg/m^3	all	50	stack and flue
NOx (as NO_2), mg/m^3	all	100	stack and flue
mercury and mercury compounds, mg/m^3	all	0.03	stack and flue
opacity (Ringelmann smoke chart]	all	1	stack vent

Emission standard for air pollutions from coal-fired boilers (GB13271-2014)

Separate emission limit values have been set for existing and new units.

Emission limits for existing coal-fired boilers

From 1 October 2015, existing steam boilers with a capacity larger than 10 t/h and existing hot water boilers with a capacity larger than 7 MW should meet the emission limit values in the following table. From 1 July 2016, existing steam boilers with a capacity below 10 t/h and existing hot water boilers with a capacity smaller than 7 MW should also meet these emission limit values.

Pollutant	Emission limit value, mg/m³	Monitoring location
particulate	80	stack or flue
SO_2	400	stack or flue
	550*	
nitrogen oxides	400	stack or flue
mercury and mercury compounds	0.05	stack or flue
opacity (Ringelmann smoke chart)	≤1	stack exit

* Value applicable to existing coal-fired boilers located in Guangxi Zhuang Autonomous Region, Chongqing City, Sichuan Province and Guizhou Province.

Emission limits for new coal-fired boilers

From 1 July 2014, new boilers should meet the following emission limit values.

Pollutant	Emission limit value, mg/m³	Monitoring location
particulate	50	stack or flue
SO_2	300	stack or flue
nitrogen oxides	300	stack or flue
mercury and mercury compounds	0.05	stack or flue
opacity (Ringelmann smoke chart)	≤1	stack exit

Special air pollutant emissions limits for coal-fired boilers in key regions

Coal-fired boilers located in the key regions should meet the emission limit values in the following table. The key regions include Beijing City, Tianjin City, Hebei Province, Yangzi River Delta, Pearl River Delta, Central Liaoning Province, Shandong Province, Wuhan City and surrounding areas, Changsha City, Zhuzhou City, Xiangtan City, Chengdu and Chongqing City, coastal areas of Fujian Province, Central and Northern Shanxi Province, Guanzhong Region of Shaanxi Province, Gansu Province, Ningxia Province, and Wulumuqi (Ürümqi, Xinjiang Uyghur Autonomous Region). The geographical area and time to which the special emission limit values should apply are set by the Environmental Protection Administrative Department of the State Council or Provincial government.

Pollutant	Emission limit value, mg/m³	Monitoring location
particulate	30	stack or flue
SO_2	200	stack or flue
nitrogen oxides	200	stack or flue
mercury and mercury compounds	0.05	stack or flue
opacity (Ringelmann smoke chart)	≤1	stack exit

Hong Kong

The Environmental Protection Department (EPD) in the Government of the Hong Kong Special Administrative Region is empowered by the Air Pollution Control Ordinance (Cap.311) to control air pollution from industry, commercial operations and construction work. The emission standards for air pollutants from power plants are laid down by EPD and issued as *A Guidance Note on the Best Practicable Means for Electricity Works (BPM 7/1)*, first published in July 1992. All Hong Kong's Environmental Standards and Guidelines are published on the EPD's website (http://www.epd.gov.hk/epd/english/envir_standards/esg_maincontent.html). The latest BPM 7/1 (available from http://www.epd.gov.hk/epd/sites/default/files/epd/english/environmentinhk/air/guide_ref/files/bpm7_1.pdf) was published on 20 January 2014. It lists the minimum requirements for meeting the best practicable means for electricity works (coal-fired plant, gas-fired turbines and oil-fired gas turbines (peak lopping plant)). The requirements for coal-fired power plants are applicable to all units constructed after 1 January 1991 with capacity (electrical output; aggregate generating capacity) of 200 MW or larger. The BPM 7/1 also sets restrictions on burning coal that has a sulphur content greater than 1% by weight.

Emission limit values for existing coal-fired power plants

The emission limits stipulated below are applicable to all emissions during normal operations including soot blowing and load change. For smoke, the emission limits are also be applicable to the start-up and shut-down periods.

Combustion process

Pollutant	Emission limit value
particulate	50 mg/m^3 (2 hourly average)
SO_2	90% removal of the potential emission from burning coal with a maximum allowable sulphur content of 1% by weight (air dry basis). Approximate equivalent concentration: 200 mg/m^3
NOx (as NO_2)	670 mg/m^3
opacity (Ringelmann smoke chart)	<2 for start-up from cold <1 for other periods

Note: all figures, other than opacity or actually specified, are based on an hourly averaging period and expressed at 6% O_2 (or 12% CO_2 as the case may be), 0°C, 101.325 kPa and dry conditions.

Non-combustion process

Pollutant	Emission limit value, mg/m^3
particulate	50

Note: Expressed at 0°C, 101.325 kPa and undiluted conditions.

Emission allowances

In addition to Emissions Standards, EPD allocates annual emission allowances for individual power plants, both existing and new, in respect of specified licences. The emission allowances are given in the *Technical Memorandum for Allocation of Emission allowances in Respect of Specified Licences*, which is published every two years under Section 37B(1) of the Air Pollution Control Ordinance (Cap.311).

Emission allowances for coal-fired power plants for each and every emission year from 1 January 2015 to 31 December 2016

Castle Peak Power Plant

Pollutant	Emission allowance, t/y
respirable suspended particulates	420
SO_2	4,260
NOx (as NO_2)	13,390

Lamma power plant and Lamma power plant extension

Pollutant	Emission allowance, t/y
respirable suspended particulates	300
SO_2	6,780
NOx (as NO_2)	10,020

New plants

Total installed capacity (C), MW	Emission allowance, t/y		
	Respirable suspended particulates	SO_2	NOx (as NO_2)
<300	8/300 × C	12/30 × C	27/30 × C
≥300	8	120	270

where

C is the total installed capacity of the new power plant.

Emission allowances for coal-fired power plants for each and every emission year from 1 January 2017 to 31 December 2018

Castle Peak Power Plant

Pollutant	Emission allowance, t/y
respirable suspended particulates	389 + (21 – B) × 0.038
SO_2	3757 + (21 – B) × 0.367
NOx (as NO_2)	389 + (21 – B) × 0.038

where

B is the aggregate of total net sent-out electricity output (in GWh) from the renewable energy systems to the grid of Castle Peak Power Plant in the emission year.

Lamma power plant and Lamma power plant extension

Pollutant	Emission allowance, t/y
respirable suspended particulates	250 + (2 – A) × 0.027
SO_2	5200 + (2 – A) × 0.614
NOx (as NO_2)	9450 + (2 – A) × 0.941

where

A is the aggregate of total net sent-out electricity output (in GWh) from the renewable energy systems to the grid of Lamma power plant and Lamma power plant extension in the emission year.

New plants

Pollutant	Emission allowance, t/y
respirable suspended particulates	7 × (C/300) × (D/12) – E × 0.004
SO_2	90 × (C/300) × (D/12) – E × 0.047
NOx (as NO_2)	230 × (C/300) × (D/12) – E × 0.120

where

C is the total installed capacity (MW) of the new power plant, or 300, whichever is smaller;
D is the total number of months in the emission year after the commencement of operation of the plant and part of a month is taken as a full month in the determination;
E is the aggregate of total net sent-out electricity output (in GWh) from the renewable energy systems to the grid of the plant in the emission year.

Emission allowances for coal-fired power plants for each and every emission year from 1 January 2019 and thereafter

Castle Peak power plant

Pollutant	Emission allowance, t/y
respirable suspended particulates	389 + (21 – B) × 0.035
SO_2	4678 + (21 – B) × 0.418
NOx (as NO_2)	12358 + (21 – B) × 1.105

where

B is the aggregate of total net sent-out electricity output (in GWh) from the renewable energy systems to the grid of Castle Peak Power Plant in the emission year.

Lamma power plant and Lamma power plant extension

Pollutant	Emission allowance, t/y
respirable suspended particulates	200 + (2 – A) × 0.022
SO_2	4250 + (2 – A) × 0.548
NOx (as NO_2)	8980 + (2 – A) × 0.973

where

A is the aggregate of total net sent-out electricity output (in GWh) from the renewable energy systems to the grid of Lamma power plant and Lamma power plant extension in the emission year.

New plants

Pollutant	Emission allowance, t/y
respirable suspended particulates	7 × (C/300) × (D/12) – E × 0.004
SO_2	90 × (C/300) × (D/12) – E × 0.047
NOx (as NO_2)	250 × (C/300) × (D/12) – E × 0.131

where

C is the total installed capacity (MW) of the new power plant, or 300, whichever is smaller;
D is the total number of months in the emission year after the commencement of operation of the plant and part of a month is taken as a full month in the determination;
E is the aggregate of total net sent-out electricity output (in GWh) from the renewable energy systems to the grid of the plant in the emission year.

UPDATED: 1 October 2015