Policy Progress of Air Pollution Prevention and Control in China

Xianbing Liu Research Leader/Principle Policy Researcher Climate and Energy Area Institute for Global Environmental Strategies (IGES) E-mail: liu@iges.or.jp 1) Regulation and management system for air pollution prevention and control in China

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Air pollution prevention and control history in China



Features: Local air pollution

Target pollutants: Smoke dust, SPM

-1990) Initial stage 972.

smoke dust removal Law and standards: Air

Industrial point

source control,

• Key tasks:

Pollution Prevention and Control Law (1988); GB3095-1982

Features: Regional air pollution, acid rain

Target pollutants: Acid rain, SO₂, SPM

- Key tasks: Coal-
- fired boilers and
- -2000) industrial emissions
- control, key cities
- 991 and regions
- Law and
- standards: Law revisions (1995, 2000); GB3095-1996; emission standards of boiler and thermal power plant; etc.

- Features: Regional and compound air pollution
- Target pollutants: SO₂, NO_x and PM10
- Key tasks: Total
- pollutant control,
- (2001 2010)regional joint
 - actions

Transition stage

- Law and
- standards: Revised emission standards
 - of boiler and thermal power plant; FYP for SO₂ pollution control; etc.

• Features: Regional and compound air pollution

• Target pollutants: Smog, PM10, PM2.5, VOCs, O₃ resent) • Key tasks: Integrated control of multiple sources and D **t**0 pollutants, heavy 2011 pollution forecast and early warning

Tackling stage

• Law and standards: Law revisions (2015, 2018); GB3095-2012; FYP; Action plans; etc.

Source: Wang, W.X. et al., 2019. Research of Environmental Sciences, Vol. 32, No.10, 1621-1635.

stage

Development

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China's regulation system on air pollution prevention and control



Change of China's national environmental authority



Source: MOEE website and annotated by the author.

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Basic items of China's 'Ambient Air Quality Standard'

Pollutant	Average time	Concentration limit		Unit	
		Grade 1	Grade 2	Unit	
SO_2	Annual	20	60		
	24 hours	50	150		
	1 hour	150	500	ug/m ³	
NO ₂	Annual	40	40	μg/III	
	24 hours	80	80		
	1 hour	200	200		
CO	24 hours	4	4	m_{α}/m^{3}	
CO	1 hour	10	10	mg/m²	
O ₃	Maximum of 8 hours in 1 day	100	160		
	1 hour	160	200		
PM10	Annual	40	70	ua/m ³	
	24 hours	50	150	μg/m²	
PM2.5	Annual	15	35		
	24 hours	35	75		

- Standard No.: GB3095-2012
- Issued on 29/02/2012 and enacted since 01/01/2016
- Grade 1: Nature reserves, scenic spots and other areas requiring special protection
- Grade 2: Residential areas, mixed commercial/transport/residential areas, cultural areas, industrial and rural areas
- Added the limits for PM2.5 and O_3 .
- Air quality guideline value (AQG) of WHO: 10 (Annual) and 25 µg/m³ (24 hours).
- Interim target -1 of WHO: 35 (Annual) and 75 µg/m³ (24 hours)

PM2.5 sources in Beijing and Guangzhou



- Released on 29/09/2021
- Local: 60%; Regional transmission: 40%
- Major sources of local emissions: Vehicle, livelihood, dust and industrial



- Released on 01/03/2022
- Major sources of emissions: Vehicle, livelihood, biomass-burning and coal-burning
- Measures: vehicle control, coal and dust reduction

 $Source: \ http://pc.nfapp.southcn.com/38/6272577.html; \ http://sthjj.beijing.gov.cn/bjhrb/index/xxgk69/sthjlyzwg/fthg/11143030/index.html.$

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Chungang University Seminar

'Action Plan for Air Pollution Prevention and Control (2013-2017)'



State Council, 10/09/2013

- To reduce PM10 concentration in cities above prefecture level by: >10% (From 2012 level).
- To reduce PM2.5 concentration in key areas by: ~25% for Beijing-Tianjin-Hebei; ~20% for Yangtze River Delta; ~15% for Pearl River Delta: (From 2012 level).
- To reduce annual average PM2.5 concentration in Beijing to: $\sim 60 \ \mu g/m^3$.



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10 articles, 35 items

- Stricter regulations on coal boilers and VOCs.
- To improve fuel quality and scrap old cars.
- To curb facility expansion in high-polluting and energy-consuming industries.
- To accelerate disposal of outdated equipment and reduce excessive capacity.
- To curb total coal consumption and promote clean energy use.
- Market mechanism for cost pass-through.
- Revision of Air Pollution Control Law.
- To build regional cooperation mechanism.

Source: http://www.gov.cn/zwgk/2013-09/12/content_2486773.htm.

'Three-year Action Plan for Winning the Blue Sky Defense War (2018-2020)'

State

Council,

27/06/

2018

Concrete

measures

- In line with the targets of the national 13th FYP.
- Reduction of SO₂ and NOx total emissions by: 15% (From 2015 level).
- Reduction of PM2.5 concentration by: 15% (From 2015 level, for cities exceeding the standard).
- Ratio of good air quality days: 80% (Cities above prefectural level)
- Reduction of percentage of days with severe pollution by: 25% (From 2015 level).
- Address of co-benefit of air pollutant and GHG reductions.

10 articles, 39 items • Corrective measures for 'scattered, cluttered and dirty' enterprises.

- To accelerate retrofits to achieve ultra-low emissions in steel industry.
- To promote clean heating in northern regions.
- To implement measures for coal-fired boilers.
- To promote retrofits of coal-fired power plants to achieve low emissions.
- To realize green transportation by increasing the ratio of railway freight.
- To accelerate fuel oil quality upgrade.
- To promote comprehensive measures for open mines.
- To strengthen measures against yellow sand.
- Substantial reduction of emissions in autumn and winter in key areas.
- To implement VOCs control plan in priority sectors.
- To build cross-region air pollution control cooperation mechanism.

Targets by 2020

Source: http://www.gov.cn/zhengce/content/2018-07/03/content_5303158.htm.

Reinforcement of VOCs measures to reduce O₃ concentration

VOCs are important precursors of PM2.5 and O_3 . China has been relatively slow but started to address VOCs in recent years.

'Air Pollution Prevention and Control Law' (Revised in 08/2015)

'Action Plan for the Reduction of VOCs in Key Industries' (07/2016)

'The 13th FYP for VOCs Pollution Prevention and Control' (09/2017)

'Comprehensive Measures against VOCs in Key Industries' (06/2019)

'2020 Strategy for Managing VOCs' (06/2020)

- Includes VOCs in monitoring scope for the first time, and provides a legal basis for VOCs control.
- Pledges to reduce industrial VOCs emissions by more than 3.3 million tons by 2018 compared to 2015 level.
- Proposes to reduce VOCs by 10% by 2020, and requests each region to develop an implementation plan for VOCs prevention and control.
- Designates key areas (Beijing-Tianjin-Hebei, Yangtze River Delta and Fenwei Plain) and industries (Chemicals, coatings, printing, etc.), and requests stricter measures.
- Aims to increase good air quality days in summer (June to September) by 11 days compared to the previous year by a series of measures.

Implementation outcome of 'Action Plan (2013-2017)'

Items		Target by 2017	Actual outcome	
PM10 concentration	Cities above prefectural level	>10%	22.7% (From 2013)	
	Beijing-Tianjin-Hebei	~25%	39.6%	Zh
DM25 concentration	Yangtze River Delta	~20%	34.3%	
PINI2.5 concentration	Pearl River Delta	~15%	27.7%	g (
	Beijing (µg/m ³)	~60	58 (2013: 89.5)	sta

Source: China Ambient Air Quality Management Assessment Report (2018). Available at: http://www.cleanairchina.org/file/loadFile/209.html.

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Progress in the reduction of major pollutant emissions



■ SO₂ emissions: Increasing by around 2006 → Then decreasing due to phaseout of small power units and adoption of desulfurization technology → Further decreasing since the 12^{th} FYP due to stricter measures and energy structure change.

■ NO_x emissions: Similar trend with SO₂. Decreasing since the 12th FYP due to strict denitrification measures and enhancement of vehicle emission standards.

PM: Decreasing after 2014 due to dust removal technology application, and great contribution of industrial dust removal to PM2.5 and PM10 reduction.

Source: Annual Statistical Report on the Ecological Environment (2000-2021). URL: https://www.mee.gov.cn/hjzl/sthjzk/sthjtjnb/index.shtml.

Continuous improvement of ambient air quality in China



■ Average share of days with excellent and good quality: 60.5% (2013)→78.8% (2016) →87.5% (2021)



• Key pollutants in Beijing and Shanghai: PM2.5, PM10 and NO₂ (2013) \rightarrow PM2.5 and O₃ (2016) \rightarrow O₃ and PM2.5 (2021)

Source: Bulletin on China's Environmental Status (2013, 2016 and 2021). URL: https://www.mee.gov.cn/hjzl/sthjzk/zghjzkgb/.

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China's experiences in air pollution prevention and control

Gradual improvement laws and regulation system

Continuous innovation of management mechanism

Establishment of a sound standard system

Regular update of targets and requirements in the FYP

Strong scientific and technology support system

Application of economic incentives

Enhancement of public participation

Challenges and the way forward

Challenges

- PM2.5 pollution is still severe. It is the pollutant with the largest number of cities over the standard.
- O₃ pollution is becoming prominent. Its concentration presents a fluctuating and rising trend.
- Regional heavy pollution still occurs frequently, i.e., Beijing-Tianjin-Hebei, Fenwei Plain and Northeast. It is caused by PM2.5 and mainly occurs in autumn and winter.

Targets and actions in the 14th FYP (2021-2025)

- Share of days with excellent and good air quality in 339 cities: 87.5% (87% in 2020).
- To address prevention and control at the sources, implement comprehensive policies and strengthen multi-pollutant coordinated control and regional coordinated management.
- To promote the coordinated control of PM2.5 and O_3 , reduce PM2.5 concentration in cities by 10%, effectively curb the increasing trend of O_3 and basically eliminate heavy pollution.
- To improve air quality in key regions and promote clean heating, industrial kiln control and ultralow emission retrofit in non-electricity industries in northern region.
- To accelerate the comprehensive control of VOCs emissions and reduce the total emissions of VOCs by more than 10%.

Source: The 14th FYP of National Economy and Social Development. URL:http://www.gov.cn/xinwen/2021-03/13/content_5592681.htm.



Thank you very much for the kind attention!