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Pollution Emission Trading: A Possible Solution to China's Enforcement Obstacles in Fighting Against Air Pollution?

*Jiangfeng Li**

ABSTRACT

China's air pollution has become a major environmental concern for the Chinese government and the Chinese public. Although China has established a comprehensive legal framework for environmental protection, many obstacles impede the enforcement of environmental laws and regulations. In light of the Chinese government's vigorous use of emission trading as a primary means of addressing the environmental problems in recent years, this paper identifies and explains the major economic, legal, political, social, and cultural impediments to enforcing the environmental regulation of China. The paper then engages in a comparative analysis of the emission trading programs of the United States and China, focusing on their different features and varied performance levels in terms of participation and compliance enforcement. The analysis reveals that China's pollution emission trading programs are simply hybrids of traditional command-and-control and modern market-

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based approaches to environmental regulation – approaches that have been unable to help resolve long-standing enforcement problems. Nevertheless, such empirical findings do not lead to the conclusion that China should give up emission trading. The study shows that emission trading possesses advantageous features that can help relieve the economic, political, legal, social, and cultural impediments to enforcement faced by China. The paper thus proposes that the Chinese government should undertake further reforms to establish a real market for emission trading.

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I.

INTRODUCTION

In recent years, air pollution problems in China's major cities, such as the recurring serious smog and haze in Beijing, has reached a "crisis level," raising widespread public criticism of the government's sluggish response to this problem.¹ To manage the historic air pollution levels, the Chinese government "declared a war" against pollution in March 2014.² Additionally, in August 2014, China's central government announced that it would expand the application of its emission trading mechanism after experimenting with a market-based approach through several pilot programs beginning in 2007.³ The announcement stated China's ambition to establish a nationwide emission trading market by the end of 2017.⁴ However, since China has experienced serious enforcement problems with its previous environmental protection initiatives,⁵ it is uncertain whether

1. Nathan Vanderklippe, *China's Air Pollution Reaches 'Crisis' Level*, THE GLOBE & MAIL (Feb. 25, 2014), <http://www.theglobeandmail.com/news/world/chinas-air-pollution-reaches-crisis-level/article17107203/>.

2. Lu Hui, *China Declares War against Pollution*, XINHUANET (Mar. 5, 2014), http://news.xinhuanet.com/english/special/2014-03/05/c_133162607.htm.

3. *Guo Wu Yuan Ban Gong Ting Guan Yu Jin Yi Bu Tui Jin Pai Wu Quan You Chang Shi Yong He Jiao Yi Shi Dian Gong Zuo De Zhi Dao Yi Jian* (国务院办公厅关于进一步推进排污权有偿使用和交易试点工作的指导意见) *People's Republic of China State Council Office, Guidelines on Further Promoting the Emission Trading Pilot Programs*, GUOFABAN [2014] NO. 38 (Aug. 6, 2014), http://www.mof.gov.cn/zhengwuxinxi/zhengcefabu/201408/t20140825_1130901.htm [hereinafter *Guidelines on Promoting Emission Trading Pilot Programs*].

4. *Id.*

5. See Erin Ryan, *The Elaborate Paper Tiger: Environmental Enforcement and the Rule of Law in China*, 24 DUKE ENVTL. L. & POL'Y F. 184 (2014);

China's emission trading programs have actually succeeded and whether this market-based approach can really provide a solution to China's longstanding enforcement problems.

To shed light on these uncertainties, this paper will undertake a study of China's pollution emission trading programs and their actual performance with the goal of uncovering whether the emission trading programs have helped solve, or at least reduce, these enforcement obstacles. Since China's emission trading programs were developed in light of the United States' experience with such programs, emissions trading in the United States provides important context for understanding China's emission trading practices. This paper thus includes results from a comparative analysis of emission trading practices in both China and the United States.

This paper is composed of the following five sections. Section I provides an overview of the seriousness of China's air pollution problem. Section II discusses the major obstacles for China's environmental regulation enforcement. Section III introduces the theoretical foundations of pollution emission trading, the relationship between those foundations and enforcement, and how emission trading was adopted and enforced in the United States. Section IV presents an empirical study of the actual performance of the emission trading programs in China, with the goal of showing how these programs have responded to the enforcement problems. Finally, this paper will conclude with some policy implications.

II.

OVERVIEW OF THE AIR POLLUTION PROBLEM IN CHINA

China's air pollution has become a nationwide problem that severely threatens public health and China's long-term economic development.⁶ The negative externality of China's air pollution

Tseming Yang, *Introduction: Snapshot of the State of China's Environmental Regulatory System*, 8 VT. J. ENVTL. L. 145, 147 (2007); Wang Canfa, *Chinese Environmental Law Enforcement: Current Deficiencies and Suggested Reforms*, 8 VT. J. ENVTL. L. 159 (2007).

6. See Joseph Kahn, *As China Roars, Pollution Reaches Deadly Extremes*, N.Y. TIMES (Aug. 26, 2007), <http://www.nytimes.com/2007/08/26/world/asia/>

has also potentially impacted the air quality of neighboring or even distant countries.

First, most of China's major cities have suffered from air pollution. According to a report issued by Greenpeace, a non-profit environmental organization, among the seventy-four Chinese cities monitored by the Chinese central government,⁷ sixty-nine did not meet the national standard for average annual air pollution concentrations of particulate matter 2.5 (PM2.5) (particles with a diameter of 2.5 micrometers or less).⁸ In fact, none of the seventy-four cities met the minimum standard of the World Health Organization's (WHO's) recommendations for PM2.5 levels.⁹

According to the WHO standard, healthy air shall have a PM2.5 concentration below 10 $\mu\text{g}/\text{m}^3$ (10 micrograms per cubic meter of air annual arithmetic average), while China's standard only requires a concentration below 35 $\mu\text{g}/\text{m}^3$.¹⁰ Notably, the most polluted cities on the list are all northern cities, with Beijing ranked thirteenth.¹¹ Interestingly, all of the top ten most

26china.html?pagewanted=all.

7. China only began to monitor the PM 2.5 levels in 2012, and it began to release the PM2.5 ranking in 2013. See Julie Makinen and Doug Smith, *Beijing's Smog Makes Los Angeles Air Look Good*, L.A. TIMES (Sept. 10, 2014, 5:00AM), <http://www.latimes.com/world/asia/la-fg-china-la-smog-stats-20140910-story.html>.

8. Monica Tan, *Bad to Worse: Ranking 74 Chinese Cities by Air Pollution*, GREENPEACE EAST, (Feb. 19, 2014, 5:34AM), <http://www.greenpeace.org/eastasia/news/blog/bad-to-worse-ranking-74-chinese-cities-by-air/blog/48181/>. See also Mitch Blatt, *China's Most Polluted Cities of 2013*, CHINAHUSH (Feb. 13, 2014), <http://www.chinahush.com/2014/02/13/chinas-most-polluted-cities-of-2013/> (summarizing Chinese air quality).

9. Tan, *supra* note 8.

10. World Health Org. [WHO], *WHO Air Quality Guidelines for Particulate Matter, Ozone, Nitrogen Dioxide and Sulfur Dioxide: Global Update 2005*, U.N. DOC. WHO/SDE/PHE/OEH/06.02, 9 (2006) available at http://whqlibdoc.who.int/hq/2006/WHO_SDE_PHE_OEH_06.02_eng.pdf; Junji Cao et al., *Evolution of PM2.5 Measurements and Standards in the U.S. and Future Perspectives for China*, 13 AEROSOL & AIR QUALITY RESEARCH 1197, 1197 (2013), available at http://aaqr.org/VOL13_No4_August2013/5_AAQR-12-11-OA-0302_1197-1211.pdf.

11. Beijing experienced air quality that was the "worst on record" for the PM2.5 level on January 12-13, 2013, reaching more than 600 micrograms per square meter. See *Pollution 'Worst on Record' in Beijing*, CNBC (Jan. 13, 2013, 6:21 PM), <http://www.cnbc.com/id/100375537>.

polluted cities (with an annual average PM_{2.5} concentration level above 100 µg/m³) surround Beijing.¹² In addition, all of the most polluted cities are those with concentrated industries employing low-efficiency uses of coal, such as industries for electricity generation and steel manufacturing, which are major sources of air pollution.¹³

Due to the continuously intensifying air pollution problem, China's public health and the sustainability of its economic development are in danger. According to a research report issued by the Proceedings of the National Academy of Science of the United States of America in January 2013, air pollution resulting from the Chinese government's arbitrary policies may cause "500 million residents of Northern China to lose more than 2.5 billion life years of life expectancy."¹⁴

It was also reported that in 2010 alone, air pollution caused the death of 1.2 million people in China.¹⁵ Such pollution also placed a huge burden on China's economic development. For example, a Massachusetts Institute of Technology (MIT) study showed that China's economy incurred a cost of \$112 billion in 2005 due to lost labor and increased need for health care arising from the pollution.¹⁶ In addition, China has had to divert more

12. *Air Quality of Beijing and Impacts of the New Ambient Air Quality Standard*, ATMOSPHERE, 6, 1243, 1251-1252, (2015), <http://www.mdpi.com/2073-4433/6/8/1243/pdf>.

13. See Edward Wong, *Most Chinese Cities Fail Minimum Air Quality Standards, Study Says*, N.Y. TIMES (March 27, 2014), http://www.nytimes.com/2014/03/28/world/asia/most-chinese-cities-fail-pollution-standard-china-says.html?_r=0.

14. The authors arrived at this figure by reducing life expectancy five years for every individual in the region. Yuyu Chena ET AL., *Evidence on the impact of sustained exposure to air pollution on life expectancy from China's Huai River policy*, 110 PROCEEDINGS OF NAT'L ACAD. OF SCI OF THE U.S. 32, 12936 (2013), available at <http://www.pnas.org/content/110/32/12936.full.pdf>.

15. Edward Wong, *Air Pollution Linked to 1.2 Million Premature Deaths in China*, THE N.Y. TIMES (April 1, 2013), http://www.nytimes.com/2013/04/02/world/asia/air-pollution-linked-to-1-2-million-deaths-in-china.html?_r=0.

16. Vicki Ekstrom, *China's pollution puts a dent in its economy*, MIT NEWS (Feb. 13, 2012), <http://newsoffice.mit.edu/2012/global-change-china-air-economy-0213>; See also, THE WORLD BANK ENV'T AND SOCIAL DEV. UNIT, COST OF POLLUTION IN CHINA: ECONOMIC ESTIMATES OF PHYSICAL DAMAGES (2007), http://siteresources.worldbank.org/INTEAPREGTOPENVIRONMENT/Resource/s/China_Cost_of_Pollution.pdf (examining both the health and non-health

funding and resources to deal with the damage caused by pollution.¹⁷ In 2010, it was estimated that the Chinese government would have to invest about USD 1.4 trillion to address China's air pollution problem.¹⁸

Moreover, since it is impossible to direct the air from one region to another, it was also reported that other countries were suffering the externality of China's air pollution. For example, China's neighboring countries like Japan and South Korea all reported concerns about the impacts China's air pollution would have on their air.¹⁹ Some scholars' studies even suggested that strong global winds have spread polluted air from China to the United States' West Coast, thus intensifying air pollution in cities like Los Angeles.²⁰

As illustrated above, the air pollution problem is so serious that China must take immediate action to effectively address it.

III.

ENFORCEMENT OBSTACLES IN AIR POLLUTION REGULATION IN CHINA

Despite the severity of China's air pollution, it has not been effectively addressed mainly due to the difficulty of enforcing environmental laws and policies. Professors Erin Ryan and Wang Canfa each provide a comprehensive analysis of these enforcement problems in their respective work.²¹ According to

economic impacts of China's Air and Water Pollution).

17. See UNEP YEAR BOOK 2014 EMERGING ISSUES UPDATE, AIR POLLUTION: WORLD'S WORST ENVIRONMENTAL HEALTH RISK 43 (2014), <http://www.unep.org/yearbook/2014/PDF/chapt7.pdf>.

18. *Id.*

19. Kate Galbraith, *Worries in the Path of China's Air*, N.Y. TIMES (Dec. 25, 2013), <http://www.nytimes.com/2013/12/26/business/energy-environment/worries-in-the-path-of-chinas-air.html>; see Julian Ryall et al., *Japan, South Korea Concerned that China's Smog Will Affect Them*, S. CHINA MORNING POST (Nov. 6, 2013, 2013, 3:11 AM), <http://www.scmp.com/news/china/article/1348605/japan-south-korea-concerned-chinas-smog-will-affect-them>.

20. *Made in China for Us: Air Pollution as Well as Exports: Study Finds Blowback Causes Extra Day Per Year of Ozone Smog in LA*, UCI NEWS (Jan. 20, 2014), <http://news.uci.edu/press-releases/made-in-china-for-us-air-pollution-as-well-as-exports/>.

21. See generally Canfa, *supra* note 5 (providing an overview of China's legal

them, China has already built a comprehensive legal framework for environmental protection,²² but a lack of law enforcement is the major obstacle to effectively implementing those laws.²³

To better understand the overall picture of China's enforcement problems, this paper divides the major obstacles of China's environmental protection regulation into economic, legal, political and sociocultural reasons. The following will briefly discuss each of them.

A. *Economic Reasons*

Since China's opening policy in 1978, economic development has always been the national priority. In 1987, the Chinese central government even announced that economic development is the "one central task" for the Chinese government.²⁴ To achieve this goal, China adopted the economic development model of the *xian wuran, hou zhili*, i.e., "pollute first, control later."²⁵ Such a model mainly relied on low-efficiency uses of natural energy such as coal to build up China's heavy industries, including steel manufacturing.²⁶ For example, in 2009, China

framework for environmental protection and suggesting the difficulty in implementing and enforcing the laws generally was due to unrealistic legislation, local government's lack of incentive to enforce environment laws and policies, the weak judicial system and the lack of public participation); Ryan, *supra* note 5 (suggesting that China's enforcement problems were mainly due to weak enforcement against violators, lack of local enforcement of central government's rules, weak judicial enforcement, and China's lack of rule of law in general).

22. See *generally Environment*, CHINA.ORG (last visited Nov. 1, 2014), <http://www.china.org.cn/english/environment/34152.htm> (listing effective environmental laws in China).

23. Canfa, *supra* note 5, at 165-166.

24. This is the so-called "one central task and two basic points" policy adopted by the China government in 1987. The one central task refers to economic development. The two basic points refer to the four cardinal principles (the socialist road, the people's democratic dictatorship, the leading role of the Party, and Marxism-Leninism-Mao Zedong thought), and the policy of reform and opening up. See *1987: One Central Task and Two Basic Points*, CHINA.ORG.CN (Sept. 16, 2009), http://www.china.org.cn/features/60years/2009-09/16/content_18535066.htm.

25. Alex Wang, *The Role of Law in Environmental Protection in China: Recent Developments*, 8 VT. J. ENVTL. L. 195, 198 (2007).

26. *Research Resources and Environmental Problems in China's Industrial*

consumed nearly half of the world's coal, which accounted for about seventy percent of China's total energy use.²⁷ But the use of coal is very inefficient and has heavily contributed to environmental pollution, including air pollution. For instance, in 2011, China consumed twenty percent of the world's total energy, but only generated about ten percent of global GDP.²⁸

With this backdrop, any environmental policy that aims to transition from low-efficiency to high-efficiency energy use will inevitably impose a burden on China's current economic growth, conflicting with the Chinese government's central task. Currently, China has not achieved economic maturation and is still striving for maximum economic growth.²⁹ In recent years, the Chinese government has sought to refocus its development from heavy industry to diverse high-end industries and to build up an environmentally-friendly economy.³⁰ As long as the conflict exists between environmental protection and economic growth, however, the government still lacks a strong incentive to fully enforce and implement the environmental protection goals.

Accordingly, economic motives were the fundamental factors that caused China's environmental problems and served as major impediments for effective enforcement of environmental

Development 3 ACAD. OF SOC. SCI. ACAD. ADVISORY BD. BULL. (2007), at 5, available at <http://gjs.cass.cn/pdf/news/zggyfzzzyhjwtyj.pdf>.

27. Monica Tan, *8 Must-Know Facts about China's Air Pollution Crisis*, GREENPEACE (Feb. 7, 2013), <http://www.greenpeace.org/eastasia/news/blog/8-must-know-facts-about-chinas-air-pollution-/blog/43862/>.

28. See Gerard Burg, *Coal's Continuing Dominance in Chinese Energy Supply Makes Clean-Air Campaign an Uphill Battle*, S. CHINA MORNING POST (Apr. 25, 2014, 10:57AM), <http://www.scmp.com/comment/insight-opinion/article/1496542/coal-s-continuing-dominance-chinese-energy-supply-makes-clean>.

29. Christine J. Lee, *"Pollute First, Control Later" No More: Combating Environmental Degradation in China Through an Approach Based in Public Interest Litigation and Public Participation*, 17 PAC. RIM L. & POL'Y J. 795, 797 (2008) (analyzing that China followed the "pollute first and control later" model from the western countries like US and Japan, but determining that China's situation is unique because it suffered environmental deterioration before its economic maturation).

30. GUO WU YUAN GUAN YU YIN FA GUO JIA HUAN JING BAO HU "SHI ER WU" GUI HUA DE TONG ZHI (STATE COUNCIL ON THE ISSUANCE OF THE STATE ENVIRONMENTAL PROTECTION "TWELFTH FIVE YEAR PLAN"), PKULAW CLI.2.163978 (People's Republic of China State Council 2011).

regulation. These factors also explain why there was widespread “superficial enforcement” as described by Professor Wang Canfa.³¹

B. *Legal Reasons*

Generally speaking, China lacks a workable legal system to enforce its environmental laws and policies.

First, although China has established a comprehensive body of environmental laws, many of the laws were unrealistic and difficult to implement.³² Most of the legislation contained only general provisions, which were too abstract to enforce.³³ In addition, most laws failed to provide proper procedural and implementation mechanisms, and the liabilities provided by the laws were too lenient to deter and punish violations.³⁴

Recently, China adopted the revised People’s Republic of China Environmental Protection Law on April 24, 2014 (“2014 EPL”).³⁵ The 2014 EPL incorporated many new initiatives, such as requiring governments and enterprises to make public information on environmental quality, monitoring, penalties, etc.;³⁶ allowing non-profit organizations to file public interest claims in environmental cases;³⁷ increasing liabilities for polluters and relevant government officials; and enhancing

31. Wang, *supra* note 25, at 165-166 (explaining that the regulation of environmental assessment of construction projects are mainly superficial and the responsible agencies falsified most of the statistics regarding the assessment, thus resulting in many projects passing the environmental assessment even if they did not meet the environmental standard).

32. *Id.* at 169.

33. Jin Wang & Houfu Yan, *Barriers and Solutions to Better Environmental Enforcement in China*, NINTH INT’L CONF. ON ENV’T COMPLIANCE AND ENFORCEMENT 494, at 497 (2011), available at http://inece.org/conference/9/proceedings/56_WangYan.pdf.

34. Ryan *supra* note 21, at 219 (stating that “administrative sanctions and fines for pollution are too low to meaningfully deter violations of environmental laws”).

35. See Zhong Hua Ren Min Gong He Guo Huan Jing Bao Hu Fa (2014 Xiu Ding) [Law on Environmental Protection] (promulgated by Standing Committee of the Nat’l People’s Cong., Apr. 24, 2014, effective Jan. 1, 2015), CLI.1.223979 (PKULaw).

36. *Id.* art. 55-56.

37. *Id.* art. 58.

protection for whistleblowers.³⁸ But some still doubt whether the Chinese government has a real incentive to enforce the new environmental law because enforcement might lead to undesired consequences such as massive layoffs caused by closing heavily-polluting, state-owned companies.³⁹

Second, China's judicial branch is not an effective venue to enforce environment laws. Chinese courts are not independent from the intervention of the executive branch. They rely on the Chinese government for court staffing, funding, and the career promotion of individual judges. Thus, the courts are subject to strong political influence from the Chinese Communist Party and the Chinese central government when they decide whether to hear a case or how to decide it.⁴⁰ In addition, most judges in China are not well trained, and they often do not have adequate expertise to render reasonable judgments in adjudicated cases.⁴¹ Moreover, even if a plaintiff received a favorable judgment from a Chinese court, it is still very difficult to enforce the judgment.⁴²

Third, unlike Western countries such as the United States, China generally lacks the legal culture to resolve problems through courts or laws. In contrast, the government achieves specific regulatory goals mainly through issuing temporary or short-term administrative directives. For example, in order to maintain good air quality for the Asia-Pacific Economic Cooperation (APEC) forum in Beijing in November 2014, the Chinese government temporarily implemented a series of policies in Beijing as well as the surrounding cities, including

38. *Id.* art. 59, 62-63, 68.

39. *Clearing the Air on China's New Environmental Protection Law*, HOGAN LOVELLS (May 2014), available at http://www.hoganlovells.com/files/Uploads/Documents/China%20alert_Clearing_the_Air_on_China_s_New_Environmental_Protection_Law_HKGLIB01_1106122.pdf (commenting that the effect of the 2014 EPL depends on whether the government can empower the Ministry of Environmental Protection and its local organs to enforce the EPL).

40. Ryan, *supra* note 21, at 218-19 (stating that "too many environmental cases never make it into court, often for reasons of naked political interference").

41. DEBATING POLITICAL REFORM IN CHINA: RULE OF LAW VS. DEMOCRATIZATION, 152 (Suisheng Zhao ed., 2006) (stating that Chinese judges were known for the low quality in judicial reasoning and the existing judges have the problem of low education).

42. Wang & Yan, *supra* note 33, at 499-500. .

closing some plants, restricting use of private vehicles, suspending the operation of some companies generating polluted particles, etc.⁴³

Ironically, some measures the government adopts lack a legal basis themselves. For example, when government measures only partially improved the air quality in Beijing during the APEC period, the Beijing government blocked access to air quality data from the U.S. Embassy air quality monitor through websites or smart phone application.⁴⁴ The way the Chinese government dealt with air quality control during the APEC period leads us to reasonably question why industries in violation of the relevant environmental standards were not shut down before APEC. Also, the government's activities proved that environmental protection was not regulated by laws, but rather by the particular needs of the government. This leads us to wonder where the rule of law applies to China's environmental regulation.

Accordingly, the laws and the judicial system, which are both crucial in environmental regulation enforcement, only played a limited role in China's environmental regulation.

C. *Political Reasons*

The Chinese political structure and the political performance review standard also contribute to the enforcement problems of China's environmental regulation.

First, there is an unclear division of responsibilities in environmental regulation between China's central government and its local governments. The national regulatory agency—State Environmental Protection Agency—has made most of the environmental protection policies but it plays a very minor role in the actual implementation and enforcement of those policies.⁴⁵

43. Zheng Jinran, *Beijing to Keep the Lid on Air Pollution for APEC*, CHINA DAILY (Oct. 10, 2014, 03:28AM), http://www.chinadaily.com.cn/china/2014-10/10/content_18714550.htm.

44. Simon Denyer and Xu Yangjingjing, *Unable to Clean Air Completely for APEC, China Resorts to Blocking Data*, WASH. POST (Nov. 10, 2014), <http://www.washingtonpost.com/blogs/worldviews/wp/2014/11/10/unable-to-clean-air-completely-for-apec-china-resorts-to-blocking-data/>.

45. See COMM. ON ENERGY FUTURES AND AIR POLLUTION IN URBAN CHINA AND THE U.S., ENERGY FUTURES AND URBAN AIR POLLUTION: CHALLENGES FOR

Local environmental protection bureaus controlled by local governments are entrusted with the major responsibility to enforce the environmental laws and policies, but there is very little cooperation between bureaus. They thus have minimal or no incentive to reduce pollution emissions that will have cross-regional effects.⁴⁶

Second, since the “reform and opening” policy implemented in China in 1978, the political performance evaluation of government officials has been mainly based on economic performance (i.e., GDP growth), with no regard to environmental protection or degradation.⁴⁷ Generally speaking, local government officials are reappointed or their positions are renewed on a five-year term basis. Therefore, in order to secure a promotion or at least maintain their current position, government officials are incentivized to promote economic growth as much as possible, even at the sacrifice of the environment. In addition, since Chinese government officials are not directly elected through votes by the citizens of China, but are instead nominated by China’s high-level government,⁴⁸ local governments do not have much incentive to care about negative environmental impacts on the public as long as they can maintain GDP growth for China.

Third, China’s dual fiscal mechanism also contributes to local governments’ lack of incentive to enforce environmental policies that will slow down economic development. Under the dual fiscal mechanism, local governments need to finance their public service as well as governmental expenses (such as the government officials’ salaries and benefits) through raising local taxes, which is directly linked to economic development.⁴⁹ Because strict enforcement of environmental regulation will place burdens on economic development, or even incur costs from

CHINA AND THE UNITED STATES, 7, (2007).

46. *Id.* at 7.

47. Wang, *supra* note 25, at 198-99.

48. Wang & Yan, *supra* note 33, at 495.

49. *Id.* at 496.

government funds, local governments are generally very reluctant to enhance environmental enforcement.⁵⁰

Accordingly, without changing the incentives of local governments, these political factors will continue to impede environmental enforcement in China. In recent years, the Chinese central government has begun to include environmental protection as a factor in a government official's political performance assessment;⁵¹ however, it is still unclear whether they have actually followed such guidelines since the assessments are not public.

D. *Sociocultural Reasons*

Chinese culture was not characterized by a strong belief in environmental protection, and the public generally tolerated the infringement of their environmental rights.⁵² But the public has become more concerned about environmental protection in recent years as air pollution and water contamination have become more and more threatening to people's daily lives and health.⁵³ Although the Chinese government has allowed the public to raise environmental complaints with government agencies through a variety of means such as letters, phone calls, visits, reports in media or public protests, the complaints can only address existing violations and may not challenge development plans or policies that could have a future impact on the

50. *Id.*

51. "Shi Er Wu" Jie Neng Jian Pai Zhong He Xing Gong Zuo Fang An (国务院关于印发"十二五"节能减排 综合性工作方案的通) [The Twelfth Five Year Plan's Comprehensive Energy Conservation Work Plan] (promulgated by People's Republic of China State Council, Aug. 31, 2011), http://www.gov.cn/zwqk/2011-09/07/content_1941731.htm.

52. See Xiaofan Li, *The Weak Link: Diagnosing Political and Social Factors in China's Environmental Issue*, 2 CHINESE STUDIES 178, 182 (2013); Chen Xin, *Public Awareness of Environment Grows*, CHINA DAILY (Apr. 20, 2012), http://www.chinadaily.com.cn/china/2012-04/20/content_15094802.htm.

53. See JINGYUAN LI & TONGJIN YANG EDS., CHINA'S ECO-CITY CONSTRUCTION 59 (2015); CHINA COUNCIL FOR INTERNATIONAL COOPERATION ON ENVIRONMENT AND DEVELOPMENT (CCICED), TASK FORCE SUMMARY REPORT: CHINA'S ENVIRONMENTAL PROTECTION AND SOCIAL DEVELOPMENT 7 (Nov. 2013), available at <http://www.cciced.net/encciced/policyresearch/report/201412/P020141219325744337876.pdf>.

environment.⁵⁴ Therefore, even when the government adopts an economic policy that will potentially have a large environmental impact, it could still successfully implement that policy without any legal recourse for the public.

Moreover, in contrast to Western countries like the United States, China lacks strong environmental non-profit organizations (NGOs), which can influence the public's awareness of environmental protection, raise public interest claims, and affect the government's environmental policies.⁵⁵ For the limited number of environmental NGOs existing in China,⁵⁶ the ability to play a role in environmental protection is constrained due to their "limited skills, funding and autonomy and operating in a highly controlled political space."⁵⁷ Chinese NGOs are mainly limited to advocating government-approved purposes, such as educating the public and raising the public's environmental awareness to the extent allowed by the government. Otherwise, they might fail to retain their required annual registration with the government, which is a precondition for the existence of an NGO under Chinese law.⁵⁸

Furthermore, unlike in the United States, in China the concept of pursuing public interest litigation through a non-profit organization is still very novel to the public.⁵⁹ China only had its first real threat of a public interest lawsuit brought by an NGO against the government in 2009.⁶⁰ Although the 2014 EPL

54. Jonathan Schwartz, *Environmental NGOs in China: Roles and Limits*, 77 PAC. AFF. 28, 35 (2004).

55. *Id.* at 36 (explaining that the number of NGOs is 40 if a NGO is defined as an organization that does not depend on government funding).

56. *Id.*

57. *Id.* at 41-42.

58. *Id.* at 37-38.

59. Ryan, *supra* note 5, at 215 (suggesting that "the idea of allowing an organization to bring a public interest environmental suit on behalf of others—an important tool of environmental litigation in the United States—is still a new one in China").

60. See Tania Branigan, *Chinese to Launch First Evergreen Lawsuit against Government*, THE GUARDIAN (July 31, 2009, 11:07AM), <http://www.theguardian.com/environment/2009/jul/31/china-residents-prosecute-government-environment> (stating that the environmentalists complained that the Chinese courts usually disregarded this kind of public interest claim).

has incorporated a public interest provision that allows eligible NGOs to bring public interest actions in environmental cases,⁶¹ it is still unclear whether this provision could really change the long-standing cultural barriers to public interest actions.⁶² This is especially true considering the fact that, in the past, the Chinese courts were very reluctant to hear public interest cases brought by some NGOs and declined most of them.⁶³

As explained above, economic, legal, political and sociocultural reasons have collectively contributed to the current enforcement problems of China's environmental regulation.

IV.

THEORETICAL FOUNDATIONS FOR POLLUTION EMISSION TRADING AND ENFORCEMENT

Despite the enforcement problems outlined in the previous section, recently, after its implementation of several pilot pollution emission trading programs in several cities and provinces, the Chinese government has announced its ambitious plan of establishing a nationwide pollution emission trading system by 2017.⁶⁴ This seems to indicate that the Chinese government has been satisfied with the performance of the pilot emission trading programs so far; therefore, it is worthwhile to take a closer look into the existing pollution trading practices in China to evaluate whether a market-based approach for

61. Zhong Hua Ren Min Gong He Guo Huan Jing Bao Hu Fa (2014 Xiu Ding) [Law on Environmental Protection] (promulgated by Standing Committee of the Nat'l People's Cong., April 24, 2014, effective Jan. 1, 2015), art. 58, CLI.1.223979 (PKULaw).

62. See generally Alex L. Wang & Jie Gao, *Environmental Courts and the Development of Environmental Public Interest Litigation in China*, 3 J. CT. INNOVATION 37, 37-38, 49-50 (2010) (finding that environmental courts in China are improving China's environmental enforcement, but questioning how successful these courts can be in the long-term).

63. David Pettit, *A Step Forward for Public Interest Litigation in China*, NATURAL RES. DEF. COUNCIL: SWITCHBOARD (Apr. 28, 2014), http://switchboard.nrdc.org/blogs/dpettit/a_step_forward_for_public_inte.html (stating that "[s]ome Chinese environmental NGOs have attempted to bring public interest cases but have been shut out of court").

64. See *Guidelines on Promoting Emission Trading Pilot Programs*, *supra* note 3.

environmental regulation has helped eliminate or reduce the impediments to environmental enforcement.

Before engaging in a study of China's emission trading practice, this section will first look into the theoretical foundations of the pollution emission trading mechanism and its relationship with enforcement issues. This section will draw from the experience of the United States' application of the emission trading program to explore how this mechanism interacts with enforcement problems.

A. *Theoretical Foundations of Pollution Emission Trading*

Pollution emission trading is part of a group of approaches to solving pollution problems through market-based mechanisms.⁶⁵

According to Professor Carol Rose, the environmental problem is inherently a problem of the commons.⁶⁶ She suggests four strategies to address this problem: (1) Do-nothing, *i.e.*, leaving resources for open-access; (2) Keepout, *i.e.*, excluding the newcomers, and limiting the use of resources to insiders; (3) Rightway, *i.e.*, regulating the use of resources, such as limiting the amount an individual uses a resource; and (4) Property, *i.e.*, granting property rights in resources and even allowing the right holders to trade such rights.⁶⁷

Traditional environmental regulation, including air pollution regulation, mainly reflects the Rightway approach, which is the so-called "command-and-control" approach.⁶⁸ Market-based environmental regulation is mainly based on the Property approach.⁶⁹ It has been widely argued that the market-based approach is the more effective and cost-efficient way to address modern environmental problems, such as the air pollution

65. Thomas W. Merrill, *Explaining Market Mechanisms*, 2000 U. ILL. L. REV. 275, 276 (2000).

66. Carol M. Rose, *Rethinking Environmental Controls: Management Strategies for Common Resources*, 1991 DUKE L.J. 1, 3 (1991).

67. *Id.* at 9-10.

68. *Id.* at 10 (explaining that the command-and-control approach normally requires that "would-be polluters use the air only in the 'right way'; that is, they may emit pollutants into the air, but only through the use of specific control equipment . . .").

69. *Id.* at 10-11.

problem.⁷⁰ Emission trading is one type of the environmental regulations utilized in the market-based approach; other market-based mechanisms can take the forms of discharge fees or taxes.⁷¹

Emission trading programs mainly take two forms: baseline-credit programs or cap-and-trade programs.⁷² In a baseline-credit program, the regulators set a baseline of pollution and the emitters have to reduce their emissions against this baseline.⁷³ The emitters can receive credits that are calculated by the actual emission amount against the baseline; in other words, if the emitter reduces its emissions below the baseline, it will earn credits for the difference between the emission amount and the baseline, and it can then trade the surplus credits it saves.⁷⁴ In a cap-and-trade program, the regulator will define an upper limit/cap of total resource access and then allocate a defined amount of emissions to different individual users through emission permits, and the individual emitters can trade the amount they do not use to other emitters who need an extra amount.⁷⁵ The SO₂ emission trading program in the United States follows the cap-and-trade scheme, which this paper will discuss in a later subsection.

B. *Emission Trading and Enforcement*

When a government adopts an emission trading program, it first needs to decide who will participate in the program and whether the participation will be mandatory or voluntary. It also

70. See Bruce A. Ackerman & Richard B. Stewart, *Comment: Reforming Environmental Law*, 37 STAN. L. REV. 1333, 1341-47 (1985); TOM TIETENBERG, EMISSIONS TRADING: AN EXERCISE IN REFORMING POLLUTION POLICY 16 (Resources for the Future) (1985).

71. Merrill, *supra* note 65, at 276.

72. Markus W. Gehring & Charlotte Streck, *Emissions Trading: Lessons From SO_x and NO_x Emissions Allowance and Credit Systems Legal Nature, Title, Transfer, and Taxation of Emission Allowances and Credits*, 35 ENVTL. L. REP. 10,219, 10,220 (2005), available at http://www.gppi.net/fileadmin/user_upload/media/pub/2005/Streck_2005_Emissions_Trading.pdf.

73. *Id.*

74. *Id.*

75. *Id.*

needs to decide whether compliance with the emission trading requirements will be mandatory or voluntary, and what penalties will be issued for non-compliance in mandatory regimes. Accordingly, the enforcement of environmental regulation can be divided into “participation enforcement” and “compliance enforcement.”⁷⁶

Participation enforcement refers to the participation of the polluting sources (*i.e.*, the pollution emitters) in emission trading programs. The regulatory authorities may choose to apply the emission trading programs to all kinds of polluting sources, or just particular types of polluting sources. The government makes participation in the emission trading programs mandatory for all or certain types of pollution emitters, and the government can enforce against the non-participating emitters. For example, in the United States’ SO₂ program, participation is mandatory for the installations that were included in the program.⁷⁷

Compliance enforcement refers to regulators’ implementation of the rules to punish non-compliant activities. The notion of compliance implicates the participants’ acting in accordance with prescribed standards.⁷⁸ In an emission trading program, a participating pollution emitter may be regarded as a compliant actor if it “correctly measures and reports its emissions” and “meets its emission reduction or limitation target.”⁷⁹ When a participant fails to comply with the requirement, the government enforces compliance by punishing the non-compliant actor.⁸⁰

Theoretically speaking, the emission trading system, *i.e.*, the marketable permit system, should work to help address the enforcement problems. Theoretical analysis shows that the emission trading system can create incentives for the polluters to participate, and also incentivizes regulators to enforce participation.

76. See Stine Aakre & Jon Hovi, *Emission Trading: Participation Enforcement Determines the Need for Compliance Enforcement*, 11 EUR. UNION POL. 427, 430 (2010).

77. *Id.* at 430.

78. *Id.* at 429.

79. *Id.*

80. *Id.* at 433.

First, the emission trading system will create economic incentives for the polluters to participate in the program.⁸¹ Unlike the traditional command-and-control system that only imposes an obligation to reduce pollution emissions, the emission trading system creates a property right in the emission permits for the right-holders. As suggested by Bruce Ackerman and Richard Stewart, the polluters will comply with the regulation so as to maintain the tradable value of their permits; otherwise, if others can pollute illegally without any cost, then no one will pay anything for the pollution permits.⁸² In addition, when participation is mandatory, the permit holders will tend to support strong compliance enforcement so as to make sure that their investment in the pollution permits will not be devalued due to loose enforcement.⁸³

Second, the emission trading system in China is controlled by the Chinese government, which has the exclusive right to grant the property rights in the emission permits to market participants.⁸⁴ Therefore, the Chinese government can receive the proceeds from the enforcement of the environmental regulation under such a system, which will create a strong incentive for the government to enforce the regulation. If the government does not closely monitor compliance, its revenue from granting permits will drop dramatically.⁸⁵ In the meantime, the government's power to grant emission permits might create a risk of over-enforcement. Any such over-enforcement tendency might, however, be offset by the government's strong desire to maintain strong economic growth, which relies heavily on the

81. Ackerman & Stewart, *supra* note 70, at 1346.

82. *Id.*

83. *Id.*

84. *See, e.g.*, Fu Jian Sheng Pai Wu Xu Ke Zheng Guan Li Ban Fa (福建省排污许可证管理办法) [Guidelines for Administration of Pollution Emission Trading Permits of Fujian Province], Provincial Decree No. 148 (Sept. 1, 2014) (requiring market participants to obtain pollution emission permits from the Fujian Province government); Guang Dong Sheng Pai Wu Xu Ke Zheng Guan Li Ban Fa (广东省排污许可证管理办法) [Guidelines for Administration of Pollution Emission Trading Permits of Guangdong Province], Provincial Decree No. 199 (Apr. 1, 2014) (imposing the same requirements on market participants in the Guangdong Province).

85. *See* Ackerman & Stewart, *supra* note 70, at 1346.

performance of the enterprises; therefore, the Chinese government may not want to let the emission permit system impose too heavy of a burden on enterprise due to over-enforcement.⁸⁶

Third, the emission trading program can, to some extent, solve the dilemma faced by the government to achieve the originally competing goals of achieving both environmental enforcement and economic development because using an emission trading program can maintain economic growth while achieving the emission reduction.⁸⁷ Under the emission trading program, companies that maintain pollution reduction with the least cost will sustain themselves, while others might voluntarily retreat from the market.⁸⁸ Therefore, the emission trading program can ensure that the companies that perform best sustain themselves in the market in order to foster economic growth.

Ideally, the emission trading system should help solve the enforcement issues to the extent that it can achieve a higher degree of participation enforcement by creating incentives for the emitters to participate and incentives for the regulators to enforce participation. Still, mere participation enforcement is not sufficient to ensure effective environmental regulation enforcement. In the real-world market, the pursuit of self-interest and adherence to norms often co-exist with conflicts, and thus the behaviors of market participants diverge.⁸⁹

In order to achieve maximum self-interest, there are often some market participants who will take risks to engage in non-

86. Nevertheless, it might still be difficult to avoid the local government agency's short-term desire to over-enforce so as to gain as much revenue as possible.

87. Stephanie Rose Benkovic & Joseph Kruger, *U.S. Sulfur Dioxide Emissions Trading Program: Results and Further Applications*, WATER, AIR, & SOIL POLLUTION, August 2011, at 245; see also Stephanie Benkovic & Joseph Kruger, *To Trade or Not To Trade? Criteria for Applying Cap and Trade*, 1 SCI. WORLD J. 953, 954 (2001) [hereinafter Benkovic & Kruger, *To Trade or Not to Trade?*].

88. Merrill, *supra* note 65, at 276 (“[T]he emissions reduction will be carried out by the firms in a position to do so with the least expenditure of resources.”).

89. Aakre & Hovi, *supra* note 76, at 430 (stating that self-interest and norms are two major motivating factors to effect the participant's behavior in an emission trading program).

compliant activities. When there is non-compliance from polluters, the effectiveness of enforcement depends immensely on whether the regulatory authorities have the ability to detect, monitor, and punish non-compliance.⁹⁰ In other words, the success of environmental regulation will largely depend on the effectiveness of compliance enforcement.

According to Stine Aakre and Jon Hovi, in emission trading programs, there are at least four kinds of potential non-compliant activities from a polluter (who is also an emission permit holder): (1) failing to “correctly measure and report” its emission amount; (2) overselling its permit, which does not “reflect a real surplus in relation to the participant’s emission limitation target”; (3) failing to purchase a sufficient amount of emission in the permit to match its real emission target; and (4) failing to comply with punishment for its non-compliance.⁹¹

Accordingly, in order to ensure effective compliance enforcement, regulatory bodies must be able to detect non-compliance and impose sufficient and effective penalties to deter and punish non-compliance.⁹² In order to better understand how the emission trading programs actually address the enforcement issues, we will look into the SO₂ emission trading program of the United States as an example, as China’s emission trading programs were based on lessons learned from the SO₂ emission trading program.

C. *Performance of the United States’ SO₂ Emission Trading Program*

The United States’ SO₂ Allowance Trading System (part of the United States’ Acid Rain Program), implemented under Title IV

90. Thomas H. Tietenberg, *Transferable Discharge Permits and the Control of Stationary Source Air Pollution: A Survey and Synthesis*, 56 LAND ECON. 391, 401-02 (1980).

91. Aakre & Hovi, *supra* note 76, at 432-33.

92. John K. Stranlund, Carlos A. Chavez & Barry C. Field, *Enforcing Emissions Trading Programs: Theory, Practice, and Performance*, 30:3 POL’Y STUD. J. 343, 345 (2002).

of the 1990 Clean Air Act Amendment⁹³, is the first national emission trading program in the United States.⁹⁴

Under the SO₂ emission trading scheme, a limited number of emission allowances are allocated to potential polluters in the market, which allows the polluters to emit one ton of SO₂ under each allowance.⁹⁵ The SO₂ allowances can be freely traded in the market or can be reserved for future use.⁹⁶ The 1990 Clean Air Act Amendments expressly stated that the SO₂ allowances could not be deemed to be property rights.⁹⁷ By expressly denying the property status of the SO₂ allowances, the statute seemed to attempt to immunize the government from legal problems that would be associated with property rights in case they would want to change the emission trading programs,⁹⁸ especially due to the fact that the United States strongly protects private property from government takings under its Constitution.⁹⁹ In practice, however, it seems that the emissions trading allowance was accepted as a property right to some degree because “it could not be sold, bought, or even saved in the bank.”¹⁰⁰ In addition, considering the United States’ legal culture of protecting individual rights, it can be reasonably expected that the rights associated with the SO₂ allowances will gain protection despite their lack of property status.

The SO₂ Allowance Trading System has been regarded as a great success in solving the air pollution problems in the United States since its implementation.¹⁰¹ The program reduced more

93. See Clean Air Act, Amendments, Pub. L. No. 101-549, § 403, 104 Stat. 2399 (1990), 42 U.S.C. § 7651b.

94. Benkovic & Kruger, *To Trade or Not to Trade?*, *supra* note 87, at 953.

95. *Id.*

96. Paul L. Joskow & Richard Schmalensee, *The Political Economy of Market-Based Environmental Policy: The U.S. Acid Rain Program*, 41 J.L. & ECON. 37, 39 n.4 (1998).

97. Clean Air Act § 403(f), 42 U.S.C. § 7651b(f) (2012).

98. See *id.*

99. U.S. CONST. amend. V (“No person shall . . . be deprived of life, liberty, or property, without due process of law; nor shall private property be taken for public use, without just compensation.”).

100. Heather Jarvis & Wei Xu, *Comparative Analysis of Air Pollution Trading in the United States and China*, 36 *Envtl. L. Rep.* 10,234, 10,241 (2006).

101. See generally Gabriel Chan, Robert Stavins, Robert Stowe & Richard

than three million tons of SO₂ in its first year of implementation in 1995,¹⁰² and in 2001 SO₂ levels had fallen by thirty-five percent compared to 1992.¹⁰³ It was also reported that the program had succeeded in achieving great cost savings for the government.¹⁰⁴ A study showed that that emissions trading had reduced the cost of complying with Title IV by fifty percent (saving \$2.5 billion annually).¹⁰⁵

D. *Enforcement Assessment of the United States' SO₂ Emission Trading Program*

It has been widely acknowledged that enforcement under the SO₂ trading program has been quite successful.¹⁰⁶ It achieved both good participation enforcement and compliance enforcement.

1. Participation Enforcement

The program has achieved good participation enforcement.¹⁰⁷ As discussed earlier, participation enforcement refers to the government's enforcement of the pollution emitters' mandatory participation in the emission trading program. It has been

Sweeney, *The SO₂ Allowance Trading System and the Clean Air Act Amendments of 1990: Reflections on Twenty Years of Policy Innovation*, HARVARD ENVTL. ECON. PROGRAM (2012), http://www.hks.harvard.edu/m-rcbg/heap/papers/SO2-Brief_digital_final.pdf (describing that the U.S. SO₂ Allowance Trading System was a great success by almost all measures and is widely viewed as having been highly effective in reducing emissions).

102. *Progress Report on the EPA Acid Rain Program*, U.S. ENVTL. PROT. AGENCY, at 5 (Nov. 1999), available at <http://www2.epa.gov/sites/production/files/2015-08/documents/1999report.pdf>.

103. U.S. ENVTL. PROT. AGENCY, LATEST FINDINGS ON NATIONAL AIR QUALITY: 2001 STATUS AND TRENDS 2 (Sept. 2002), available at <http://www3.epa.gov/airtrends/aqtrnd01/summary.pdf>.

104. NAT'L SCI. & TECH. COUNCIL COMM. ON ENV'T & NATURAL RES., NATIONAL ACID PRECIPITATION ASSESSMENT PROGRAM BIENNIAL REPORT TO CONGRESS: AN INTEGRATED ASSESSMENT 19 (1998).

105. *The United States Experience with Economic Incentives for Protecting the Environment*, U.S. ENVTL. PROT. AGENCY, at 76 (2001), available at [http://yosemite.epa.gov/ee/epa/erm.nsf/vwAN/EE-0216B-13.pdf/\\$file/EE-0216B-13.pdf](http://yosemite.epa.gov/ee/epa/erm.nsf/vwAN/EE-0216B-13.pdf/$file/EE-0216B-13.pdf).

106. Stranlund et al., *supra* note 92, at 351.

107. *Id.* at 351.

recognized that the SO₂ emission trading program has worked successfully to achieve participation of the polluting sources by making participation mandatory. This favorable result was partly attributed to the fact that the emission trading program could enable the companies to navigate such systems to “pursue a range of abatement options [that] can simultaneously protect the environment, stimulate innovation and diffusion, and reduce aggregate costs.”¹⁰⁸

The SO₂ program was implemented in two phases. Phase I started in 1995 and covered the 110 dirtiest electricity-generating facilities that used coal. Phase II began in 2000 and encompassed the remaining electricity-generating facilities that used coal and had a capacity of more than 25 megawatts.¹⁰⁹ The participants in both phases had successfully maintained their emission below the allocated level,¹¹⁰ and by 2010, SO₂ emissions dropped 49% compared to 2005;¹¹¹ therefore, this program was very successful in enabling pollution emitters to employ an emission trading mechanism to address pollution problems.

2. Compliance Enforcement

The United States’ SO₂ emission trading program achieved a consistently high rate of compliance, and by 2010, all the participants in the SO₂ program were in compliance with the program requirements.¹¹² Such high levels of compliance could be attributed to two major factors: 1) the regulator’s ability to monitor and detect the non-compliance, and 2) the regulator’s effective assessment and enforcement of punishment.¹¹³

108. Chan et al., *supra* note 101, at 31.

109. See Dallas Burtraw & Sarah Jo Szambelan, *U.S. Emissions Trading Markets for SO₂ and NO_x*, RES. FOR THE FUTURE (DISTRIBUTION PAPER 09-40), at 5 (2009).

110. *Id.* at 6.

111. *Clean Air Interstate Rule, Acid Rain Program and Former NO_x Budget Trading Program: 2010 Progress Report, Emissions, Compliance, and Market Analyses*, ENVTL. PROT. AGENCY, at 3 (2010), http://www2.epa.gov/sites/production/files/2015-08/documents/arpcair10_analyses.pdf.

112. *Id.*

113. See Stranlund et al., *supra* note 92, at 345.

The monitoring of the SO₂ trading program reflected a strong focus on the monitoring of the data, *i.e.*, the emission information of the polluters.¹¹⁴ Under the emission trading system of the United States, major trading schemes include (1) bubbles, *i.e.*, allowing the existing plants to “increase emissions at one or more emission sources in exchange for compensating extra decreases in emissions at other emission sources;”¹¹⁵ (2) offsets, *i.e.*, permitting a polluter to offset its pollution in nonattainment areas by the surplus reduction caused by that polluter elsewhere in order to allow “industrial growth in nonattainment areas without interfering with attainment and maintenance of ambient air quality standards;”¹¹⁶ (3) netting, *i.e.*, allowing the sources to exempt themselves from the offset requirement if the addition of new emission sources does not change the net emission of the existing plant;¹¹⁷ and (4) emissions banks, *i.e.*, allowing the emission permit holders to “store qualified emission reduction credits (ERCs) in EPA-approved banks for later use in bubble, offset, or netting transactions.”¹¹⁸ All four trading policies rely heavily on the emission information of the polluters; thus, keeping track of their emission data is the key to assess their emission compliance.

Regulators mainly relied on the self-reporting of the polluters.¹¹⁹ In order to deter the polluters from falsifying the emission data reports, the regulators imposed very strict requirements on the data collection technology and the data processing procedure (they used a device and technology which can automatically detect, collect, and process the emission information and then send it directly to the regulatory agency without processing by the emitting source).¹²⁰ The regulatory

114. *Id.*

115. Emissions Trading Policy Statement: General Principles for Creation, Banking and Use of Emission Reduction Credits, 51 Fed. Reg. 43,814, 43,830 (Env'tl. Prot. Agency 1986).

116. *Id.*

117. *Id.*

118. *Id.* at 43,831.

119. Stranlund et al., *supra* note 92, at 348.

120. *Id.* at 355.

agency would review or audit the data reports from the polluters to decide on their accuracy, or even conduct site reviews when necessary.¹²¹ This technology greatly helped the regulatory agency to ensure effective monitoring.¹²²

In addition to the monitoring system, the SO₂ trading program also has effective sanction mechanisms for non-compliant activities. The penalties under the program are fixed and applied automatically when any non-compliance is detected. This means that each ton of excessive emission will be charged with a fixed amount of penalty.¹²³ According to Title IV, Section 411 of the Clean Air Act, in addition to the financial penalty, the violators are also required to forfeit a substantial number of their future allowances to compensate for the excessive emission.¹²⁴ Also, the operators or owners of the source may be subject to criminal sanctions for failure to comply with the penalties issued by the enforcement agencies, as well as a civil penalty of up to \$32,500 daily per violation.¹²⁵ The penalties set forth by the regulators are predictable and severe enough to deter non-compliance for the market participants.¹²⁶

V.

POLLUTION EMISSION TRADING IN CHINA

After looking into the enforcement problems faced by China, the theoretical foundations of emission trading programs and the successful application of the United States SO₂ emission trading program, this section will turn to the current emission trading practice of China to see whether the lessons of the United States' emission trading program can help solve the enforcement problems China currently faces.

121. *Id.* at 349.

122. Tom Tietenberg, *The Tradable-Permits Approach to Protecting the Commons: Lessons for Climate Change*, 19 OXFORD REV. ECON. POL'Y 400, 405 (2003) (stating that "technology has increased administrative efficiency, lowered transactions costs, and provided greater environmental accountability.").

123. Stranlund et al., *supra* note 92, at 350.

124. Tietenberg, *supra* note 122, at 404–05.

125. Aakre & Hovi, *supra* note 76, at 436.

126. Stranlund et al., *supra* note 92, at 351.

A. *China's Application of Pollution Emission Trading*

China's adoption and practice of emission trading programs was mainly motivated by the United States' experience in dealing with the SO₂ pollution problem.¹²⁷ China's emission trading practice underwent the following three periods:

1. The Starting Period (1987-2000)

China's earliest use of emission trading started with Shanghai's sewage water emission trading in 1987, learning from the United States' experience in dealing with air and water pollution.¹²⁸ In 1991, China started to issue air pollution emission permits in six pilot cities.¹²⁹ In 1996, China expanded the implementation of the pollution emission permits nationwide during the Ninth Five-Year Plan Period (1996 to 2000).¹³⁰ During this period, China carried out several feasibility studies of its SO₂ emission trading in cooperation with the United States.¹³¹ Through the establishment of the emission permit policy, China established a cap-and-trade scheme. The government set the cap on the total emission amount and allowed individual companies to trade their emission surpluses. The pollutant being traded during this period was mainly SO₂.¹³²

127. See WANG JINNAN ET AL., SO₂ EMISSIONS TRADING PROGRAM: A FEASIBILITY STUDY FOR CHINA 2-3, 10 (China Env'tl. Sci. Press) (2002).

128. Lin Feng & Jason Buhi, *Emissions Trading Across China: Incorporating Hong Kong and Macau into an Urgently Needed Air Pollution Control Regime Under "One Country, Two Systems"*, 19 J. TRANSACTIONAL L. & POLY 123, 143 (2009).

129. Yangzhong Guo, Dan Wang & Xiaowei Ning, *Guan Yu Wan Shan Wo Guo Pai Wu Jiao Yi Ti Xi De Gou Xiang (Thoughts on How to Improve the Pollution Emission Trading in China)*, 32 METEOROLOGICAL & ENVTL. SCI. 59, 60 (2009). The six pilot cities were Baotao, Kaiyuan, Liuzhou, Taiyuan, Pingding and Guiyang.

130. See Wang Jinnan et al., *Pai Wu Jiao Yi Zhi Du De Zui Xin Shi Jian Yu Zhan Wang (The Latest Practice of Emission Trading System and Its Future)*, 10 ENVTL. ECON. 31, 36 (2008).

131. Consider, for example, the 1999 Sino-U.S. joint environmental protection project "The Feasibility of Using Cap and Trade to Achieve Sulfur Dioxide Reductions in China." See JINNAN ET AL., *supra* note 127, at 10.

132. Wang Jinnan et al., *Practices and Prospects of Emission Trading Programs in China*, CHINESE ACAD. FOR ENVTL. PLANNING, at 1, 4 (Nov. 20, 2008), available at <http://www.caep.org.cn/english/paper/The-Updated-Progress->

During this period, the emission trading was mainly carried out on a case-by-case basis. Also, local governments played a very important role in coordinating negotiations and transactions in emission trading, and the companies involved in the trading were also within the industry that the government had a strong incentive to promote. For example, in the first 1987 emission trading in Shanghai, Company A, which needed extra emission allowances for pollution discharge, was a national key project.¹³³ The Shanghai Environmental Protection Bureau deemed that it was necessary for them to support the development of this company, thus they recommended Company A purchase extra emission amounts from Company B.¹³⁴ The Shanghai Environmental Protection Bureau also coordinated the negotiation and facilitated the completion of the transaction.¹³⁵

2. The Experimental Period (2001-2014)¹³⁶

During this period, China started to gradually implement some experimental pilot emission trading programs that focused on specific pollutants, such as the SO₂ emission experimental trading in seven provinces and cities in 2002.¹³⁷ Also, China started to build up trading markets that were independent from the environmental regulation agencies, such as the emission trading pilot programs that were initiated in eleven provinces and cities in 2007.¹³⁸ During this period, all programs were

of-Emission-Trading-Programs-in-China.pdf.

133. *Shanghai Environmental Protection Blog, Chapter III – Headwater Protection, Section Implementation of Total Control*, [SHTONG.GOV.CN](http://shtong.gov.cn/node2/node2245/node4480/node60146/node60210/node60218/userobject1ai48737.html), <http://shtong.gov.cn/node2/node2245/node4480/node60146/node60210/node60218/userobject1ai48737.html> (last visited Nov. 25, 2015).

134. *Id.*

135. *Id.*

136. Feng & Buhi, *supra* note 128, at 144-45.

137. The seven provinces and cities include Shandong, Shanxi, Jiangsu, Henan, Shanghai, Tianjin and Liuzhou. See Zhengge Tu and Renjun Shen, *Can China's Industrial SO₂ Emissions Trading Pilot Scheme Reduce Pollution Abatement Costs?*, 6 SUSTAINABILITY 7621, 7622 (2014).

138. The eleven provinces and cities are Jiangsu, Zhejiang, Tianjin, Hubei, Hunan, Inner Mongolia, Shanxi, Chongqing, Henan, Shaanxi and Hebei. See *Analysis of the Pollution Emission Trading Development and Implementation in China*, TANPAIFANG.COM (Sept. 10, 2014, 11:03AM), <http://www.tanpaifang.com/paiwuquanjiaoyi/2014/09/1037864.html>.

established and operated on an experimental or pilot basis and there was no national market for emission trading.¹³⁹ The government began to expand trading from SO₂ to a wide range of other air pollutants, including: carbon dioxide (CO₂),¹⁴⁰ nitrogen dioxide (NO_x), nitric oxide, ammonia nitrogen, flue gas, and dust.¹⁴¹

3. The Expansion Period (Post-2014)

In 2014, China announced it will ascertain all the emission rights in the eleven pilot provinces and cities and will expand the emission trading practice nationwide to establish a national emission trading market by 2017.¹⁴² This action by the Chinese government indicates that it has been satisfied with the emission trading programs so far. Therefore, it might be helpful to take a closer look at how the pilot emission trading practice has actually performed.

Key Features of China's Pollution Emission Trading Programs

As discussed above, China's pollution emission trading programs are still in an experimental or pilot stage. Therefore, there is still no unified rule on the actual implementation of the programs, such as allocation of initial pollution permits, pricing of the emission trading, punishment of non-compliance, etc. Local governments can design their own guidelines for the emission trading programs implemented in their regions. Generally speaking, the current pilot emission trading programs in China share the following key features.

139. Feng & Buhi, *supra* note 128, at 145.

140. In November 2011, China approved pilot programs for CO₂ trading in seven provinces and cities, including Beijing, Chongqing, Guangdong, Hunan, Shanghai, Shenzhen and Tianjin. See Guoyi Han et al., *China's Carbon Emission Trading: An Overview of Current Development*, FORES STUDY 1, 14 (2012).

141. Jinnan et al., *supra* note 132, at 5-7.

142. Ministry of Fin. of the People's Republic of China, *State Council on Further Promoting the Right to Compensation for the Use of Sewage Guidance and Trading Pilot Work*, GUOFABAN [201] NO. 38 (2014), http://www.mof.gov.cn/zhengwuxinxi/zhengcefabu/201408/t20140825_1130901.htm.

Allocation

The current pilot emission trading programs adopt an allocation mechanism that combines the “grandfathering” approach and the “purchase” approach.¹⁴³ The Chinese local governments first decide which polluting sources are covered under the emission trading programs. Then, they allocate emission trading rights by issuing emission permits to the pollution emitters.¹⁴⁴ For old and currently existing polluting sources, the government issues free pollution trading permits.¹⁴⁵ Current pilot programs mainly use two approaches to decide the free quota. One approach is using the historical emission data of the polluting sources as the basis for the quota, and the other approach is using “average historical emissions intensity of each sector based on units of production or units of revenue to allocate quotas.”¹⁴⁶ If newer polluting sources wish to receive an emission quota or if the old emitters want to emit above the quota granted under their emission permits, they must purchase the excess amount from the government or from an emission trading market.¹⁴⁷ For example, the SO₂ emission trading programs in Taiyuan city, located in Northwest China, covered twenty-three

143. BO MIAO, EMISSIONS, POLLUTANTS AND ENVIRONMENTAL POLICY IN CHINA: DESIGNING A NATIONAL EMISSIONS TRADING SYSTEM 77 (Routledge 2013).

144. See Jintian Yang & Jeremy Schreifels, *Implementing SO₂ Emissions in China*, OECD GLOBAL FORUM ON SUSTAINABLE DEVELOPMENT: EMISSIONS TRADING CONCERTED ACTION ON TRADEABLE EMISSIONS PERMITS COUNTRY FORUM, at 13-15 (Mar. 17-18, 2003), available at <http://www.oecd.org/env/cc/2957744.pdf>.

145. See e.g., JIANG SU PROVINCE ENVTL. PROT. AGENCY AND ECON. AND TRADE COMM., JIANG SU PROVINCE DIAN LI HANG YE ER YANG HUA LIU PAI WU QUAN JIAO YI GUAN LI ZAN XING BAN FA (THE TEMPORARY IMPLEMENTING MEASURES FOR SO₂ EMISSION RIGHT TRADING OF THE POWER INDUSTRY IN JIANG SU PROVINCE), ART. 10 (2009). Chinese version is available at: http://www.jshb.gov.cn/jshbw/zcfg/zc/dfzc/200909/t20090904_130160.html.

146. ERNST & YOUNG, UNDERSTANDING CHINA'S EMISSIONS TRADING SCHEMES AND EMISSIONS REPORTING: A GUIDE TO CHINA'S PILOT EMISSIONS TRADING SCHEME AND MONITORING, REPORTING AND VERIFICATION REQUIREMENTS 1, 14 (2014), available at [http://www.ey.com/Publication/vwLUAssets/EY-](http://www.ey.com/Publication/vwLUAssets/EY-Understanding_Chinas_Emissions_Trading_Schemes_and_Emissions_Reportin)

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g/\$FILE/EY-Understanding-Chinas-ETS-and-Emissions-Reporting.pdf.

147. Yang & Schreifels, *supra* note 144, at 15.

major pollution sources in the urban city, accounting for fifty percent of the city's total SO₂ emissions. The initial allocation was based on the historical emission amount.¹⁴⁸

Pricing

As discussed previously, China's current emission trading programs have expanded to cover a variety of air pollutants, including CO₂, NO_x, ammonia nitrogen, flue gas, and dust. It is unclear, however, what basis and standards the government used to set forth the trading price for these different types of pollutants. For example, the trading guidelines issued by some local governments ambiguously state that the government should provide a guiding price for emission trading. The guidelines merely state that pricing should be decided by comprehensively considering the cost of pollution, the rarity of the natural resources, the economic development level of the region, and the capacity of traders to accept certain price levels.¹⁴⁹

Trading

The pilot emission trading programs of different local governments include different forms of trading. Generally speaking, there are two categories of trading. One category is trading through a specific platform, such as the exchange market or agency. For example, the Inner Mongolia trading exchange allows the trading participants to employ bidding (in which the highest bidder wins the trading) and mutual negotiations (which are similar to contract negotiation) in exchange markets.¹⁵⁰ The second category is trading through local governments'

148. *Id.*

149. *See, e.g.*, GUI ZHOU PROVINCIAL GOVERNMENT, GUI ZHOU SHENG PAI WU QUAN YOU CHANG SHI YONG HE SHI DIAN FANG AN (GUIDELINES FOR THE POLLUTION EMISSION TRADING PILOT PROGRAMS IN GUI ZHOU PROVINCE), ART. 7 (2014) [hereinafter GUIDELINES FOR EMISSION TRADING PILOT PROGRAMS IN GUI ZHOU].

150. Inner Mongolia Government, Nei Meng Gu Zi Zhi Qu Zhu Yao Wu Ran Wu Pai Wu Quan Jiao Yi Guan Li Gui Ze (Shi Xing) (内蒙古自治区主要污染物排污权交易管理规则(试行)) [Inner Mongolia Emission Trading Management Rules for Major Pollutants (Trial)], Issue No. 56, Art. 11 (2011).

environmental agencies. When an existing polluting resource's emission right is disqualified or removed by the government due to suspension, bankruptcy, or closing, the government can put this polluting source's remaining emission rights onto the market through auctions.¹⁵¹ Also, when a new polluting resource enters the market or the existing polluting sources wish to receive higher emission quotas, emitters can purchase emission trading rights from the government or from the trading exchange platforms.

Monitoring

Like the SO₂ emission trading program in the United States, China's pilot emission programs also rely on polluting sources to self-report their emission data. The current monitoring mechanism requires "sources [to] complete a 'Form of Emission Reporting' and provide all necessary data within the time specified by the local Environmental Protection Bureau."¹⁵² Currently, China still mainly relies on the "material balance" method (calculating the input and output of consumed materials)¹⁵³ to measure and verify SO₂ emissions.¹⁵⁴ Although some sources installed continuous emission monitors (CEMs), the same monitors used in SO₂ emission trading programs in the United States, it is still quite unrealistic to require all facilities to install CEMs because they are quite expensive.¹⁵⁵

B. Performance of China's Pollution Emission Trading Practice

Since the implementation of the pilot emission trading in eleven cities and provinces in 2007, China's pilot programs have made several achievements. By 2013, the local governments of the eleven cities and provinces established their respective emission trading platforms (*i.e.*, emission trading exchange

151. See JIANG SU PROVINCE ENVTL. PROT. AGENCY AND ECON. AND TRADE COMM., *supra* at note 145.

152. *Id.* at 11.

153. See Wikipedia: "Mass Balances", http://en.wikipedia.org/wiki/Mass_balance. Source Cited Does not Support the Statement – need new source.

154. Yang & Schreifels, *supra* note 144, at 17.

155. *Id.*

agencies) and the total emission trading amounted to RMB 4 billion (approximately \$653 million).¹⁵⁶ The local governments enacted eighteen rules and regulations and seventy-three policy guidelines in total to prescribe the details of the emission trading practice, including the pricing of the emission, the grant and allocation methods of emission right, the transaction methods, etc.¹⁵⁷ In addition, China also made some improvement in environmental enforcement, which will be discussed in the next section.

C. *Enforcement Assessment of the Emission Trading Programs in China*

The previous section discussed how regulators in the United States enforced the SO₂ emission trading programs from the perspective of 1) participation enforcement and 2) compliance enforcement. Here, it might be useful to take a similar look at how China's emission programs have addressed enforcement issues.

1. Participation Enforcement

China's pollution trading programs have made some progress in participation enforcement. First, local governments are increasingly willing to resort to emission trading to resolve pollution problems. All eleven pilot cities and provinces have actively established trading markets in their respective regions and enacted relevant rules and regulations to regulate the trading market.

Moreover, more enterprises are starting to understand the emission trading mechanisms, which is encouraging them to gradually participate in the trading market. Therefore, some regions, like Zhejiang province located near Shanghai, have been very successful at growing the trading market. Between 2007 and 2014, Zhejiang successfully established emission trading

156. *Huan Bao Bu Guan Yuan: Wo Guo Pai Wu Quan Jiao Yi Shi Dian Qi Nian Xi You Can Ban (Environmental Protection Department Officials: My Seven Pilot Emissions Trading Mixed)*, CHINA NEWS (Sept. 4, 2014), <http://finance.chinanews.com/ny/2014/09-04/6562579.shtml>.

157. *Id.*

programs covering all the cities within its regions, even encompassing seventy-five percent of its counties.¹⁵⁸ During the five-year experimental period, Zhejiang province undertook 3,863 emission trading transactions, with a total transaction amount of RMB 2.5 billion (approximately \$408 million). This total accounted for two thirds of the total amount from transactions in China.¹⁵⁹ Notably, Zhejiang's emission trading mainly focused on the pollutant SO₂.¹⁶⁰

Finally, China has adopted some new mechanisms to incentivize the emission trading market. For example, China has allowed companies to use the emission amount under the permit as collateral to obtain loans from banks.¹⁶¹ Such a measure gives emission permit holders more flexibility to use their emission rights and therefore creates incentives for companies to participate in the programs.

Despite these achievements, China's emission trading programs still face the following problems regarding the participation enforcement:

First, except for Zhejiang province, most cities do not have much active participation in the emission trading market. As stated above, nearly two-thirds of the total transaction amount during the five years' experimental period were attributed to Zhejiang province alone. In addition, most of the transactions involved only big cities. Companies located in small counties or rural areas were not involved in the programs.¹⁶²

158. *Zhe Jiang: Pai Wu Quan Jiao Yi Zong Er Zan Quan Guo San Fen Zhi Er (Zhejiang: Emission Trading Transaction Amount Accounted for Two Third of National Total)*, TANPAIFANG.COM (Sept. 15, 2014), <http://m.tanpaifang.com/article/38061.html>.

159. *Id.*

160. See Shuimiao Qian & Jie Lou, *Discussing the Legal Regime Reform of China's Emission Trading Programs — Taking Zhejiang as an Example* (Zhong Guo Pai Wu Quan Jiao Yi De Fa Zhi Jian She Tan Tao — Yi Zhe Jiang Sheng Wei Li), 32 ENVTL. POLLUTION & PREVENTION 88 (2010).

161. See Ministry of Fin. of the People's Republic of China, *supra* note 142.

162. Wang Jinnan, *Pai Wu Quan Jiao Yi Hai Xu Yao Mai Guo Ji Dao Kan (Obstacles China Needs to Overcome for Pollution Emission Trading)*, CHINA ENVTL. NETWORK (Sept. 19, 2014, 10:00 AM), <http://news.chinahbnet.com/2014/9/17/17788.html>.

Second, most transactions are conducted within the primary market, *i.e.*, between the government and the polluters, and the secondary market for the transactions between the emission right holders are not as active. Generally speaking, the governments mainly focused on how to allocate the emission rights to the polluters, but paid little attention to the secondary market's development and regulation.¹⁶³ Therefore, the participants in the emission programs were very reluctant to sell their emission rights in the secondary markets without clear guidance from the government, and those limited successful transactions were mainly completed with the assistance from the government as the middleman.¹⁶⁴ Such a situation might also potentially reduce permit holders' ability to use the emission trading permits as securities for financing.

Third, the government significantly manipulated trading, preventing a true free-trading market from being established. The government played a dominant role in identifying buyers and sellers, negotiating prices, and even preparing documents for many transactions. The government's involvement raised concerns in terms of market integrity and efficiency, especially considering the fact that China lacks professional consultants such as auditors and brokers in this kind of market.¹⁶⁵ This could be partly attributed to the fact that when implementing the emission trading programs, the local environmental protection agencies integrated other administrative measures, such as "new construction, expansion, or technical improvement projects."¹⁶⁶ For example, for some facilities that were included in emission trading programs, the government still requires them to install the expensive desulfurization technology (a method of command-and-control regulation).¹⁶⁷ As a result,

163. *Id.*

164. *Id.*

165. Julia Tao & Daphne Ngar-yin Mah, *Between Market and State: Dilemmas of Environmental Governance in China's Sulphur Dioxide Emission Trading System*, 27 ENV'T & PLAN. C: GOV'T & POL. 175, 179 (2009).

166. Jarvis & Xu, *supra* note 100, at 10,243.

167. *Zhuan Jia Biao Shi Wo Guo Fa Zhan Pai Wu Quan Jiao Yi Kun Nan Chong Chong (Experts Expressed Many Difficulties Faced by China's Emission Trading Programs)*, CHINA NEWS, <http://www.chinanews.com/ny/2011/11->

observers commented that China had not established a real emission trading program, because if there is no real market trading, permit holders cannot realize the true value of the permits.¹⁶⁸

Fourth, most pilot programs encountered technical problems such as how to set up the cap for the emission amount in regulated regions, how to initially allocate the emission rights to polluters, and how to set the price for the emission rights.¹⁶⁹ Generally, the governments were still trying to figure out how to regulate the emission trading and most of them lacked the expertise and experience to deal with the technical issues. For example, the market did not play any role in deciding the price, and it is unclear how the government calculated the pricing.¹⁷⁰ Therefore, if the total amounts and the pricing are set too high or too low, emission trading does not achieve its original goal of reducing pollution. On the one hand, too high of an emission cap intensifies pollution by encouraging polluters to emit more pollutants than the environment could withstand. On the other hand, too low of an emission cap stymies economic development.

Fifth, the Chinese government tried to expand the emission trading for the pollutant SO₂ to a wide range of other pollutants such as nitric oxide, nitrogen dioxide (NO_x), ammonia nitrogen, flue gas, and dust. Yet its current emission trading programs were established mainly based on learning from the United States' SO₂ emission trading programs. Since the Chinese government even lacks proper expertise to regulate the SO₂ emission trading system, it is not hard to imagine that the Chinese government will face more obstacles in dealing with these other pollutants, all of which are more difficult to regulate than SO₂. For a variety of toxic substances, it will be extremely difficult to trade them to the same location because they are

07/3441047_2.shtml (last visited Dec. 3, 2015).

168. *Id.*

169. Guo Tingzhong etc., *Certain Thoughts to Improve China's Emission Trading System* (关于完善我国排污权交易体系的构想), 32 METEOROLOGICAL & ENVTL. SCI. 59, 61 (May 2009). See also Song Yuli, *Three Problems of Pollution Emission Trading*, H2O-CHINA (Sept. 12, 2014, 9:57 AM), <http://www.h2o-china.com/news/130779.html>.

170. Tao & Ngar-yin Mah, *supra* note 167, at 179.

more harmful when more concentrated. Allowing facilities of these kinds of pollutants to buy allowances from others will create a “hotspot” area of such toxic substances, which does not offset the negative impact of the toxic substance but intensifies the health problems surrounding the facilities.¹⁷¹ Therefore, in such a situation, the government needs to set a proper control over the amount of toxic substance to be traded, which in turn necessarily depends on good monitoring and implementing expertise.

Sixth, the inconsistency of rules and regulations creates great uncertainty for the market. With respect to the terms of emission rights, different policies set different terms, varying from one year to twenty years.¹⁷² This situation creates many uncertainties on the market; thus, the permit right holders are often unwilling to sell extra emission amounts because they are unsure if the government will change its policies.¹⁷³ Unlike countries such as the United States that have a sound judicial and legal system to protect individual rights against government intervention or deprivation, China does not have similar levels of protections. Although some Chinese scholars argued that a pollution emission right could be regarded as a property right,¹⁷⁴ which provide more protection, even private property rights may be sacrificed for the sake of government claims of public interest or national security.¹⁷⁵ Likewise, the conflicting rules and lack of coordination between different cities also render it difficult to conduct cross-region trading.

In sum, the above-mentioned obstacles greatly reduced the participation enforcement of China’s emission trading programs.

171. See Benkovic & Kruger, *supra* note 87.

172. *2017 Nian Di Ji Ben Jian Li Pai Wu Quan You Chang Shi Yong He Jiao Yi Zhi Du (To Establish Emission Use with Payment and Emission Trading System by the End of 2017)*, STATE COUNCIL, PEOPLE’S REPUBLIC OF CHINA (Sept. 5, 2014, 8:47 AM), http://www.gov.cn/2014-09/05/content_2745770.htm.

173. *Environmental Protection Government Officials’ Interpretation of China’s Promotion of Emission Trading and Pilot Programs*, STATE COUNCIL, PEOPLE’S REPUBLIC OF CHINA (Sept. 24, 2014, 8:54 PM), http://www.gov.cn/2014-09/04/content_2745771.htm.

174. BO MIAO, EMISSIONS, POLLUTANTS AND ENVIRONMENTAL POLICY IN CHINA: DESIGNING A NATIONAL EMISSIONS TRADING SYSTEM 73-74 (2013).

175. See Jarvis & Xu, *supra* note 100.

2. Compliance Enforcement

China's pollution emission trading programs still face some challenges with respect to the compliance enforcement.

First, there is no effective monitoring mechanism. Like the United States, China adopted a self-reporting mechanism for monitoring emission trading participants' activities.¹⁷⁶ The self-reporting mechanism mainly relies on the emitters to install emission data collection and monitoring devices and then submit the data to the regulatory agencies. In practice, however, the emitters and regulatory agencies do not fully implement this mechanism to monitor and collect data.¹⁷⁷ This is partly due to the fact that some regions lack the relevant technology to employ such devices, and partly due to the fact that government officials lack the relevant expertise to maintain a self-reporting mechanism.¹⁷⁸

Second, there is no sufficient sanction mechanism that can effectively deter non-compliant behaviors. Currently, no unified rules or regulations exist for how the emission programs should be established or operated. Individual cities and provinces have issued various different or conflicting rules or guidelines to regulate the emission trading programs.¹⁷⁹ The local policies and guidelines generally do not provide sufficient mechanisms for sanctions. In Inner Mongolia (a large province located north of Beijing), the government prescribed in its guidelines for emission trading a very abstract and general provision that when there are non-compliant activities, the Environmental Protection Agency would have the right to disqualify the non-compliant participant from the emission trading market and the right to bring a suit against it in court.¹⁸⁰ These guidelines do not allow other market participants to have standing in such actions. Also, unlike the system in the United States, the

176. See Jinnan et al., *supra* note 130, at 41.

177. *Id.*

178. *Id.*

179. See Jinnan, *supra* note 163.

180. Inner Mongolia Government, Inner Mongolia Emission Trading Management Rules for Major Pollutants (Trial), No. 56, art. 26 (2011), available at <http://www.nmgepb.gov.cn/dtxx/tzgg/201108/P020111101494890482166.pdf>.

guidelines do not prescribe other penalties to deter non-compliance.

D. *Prospects of China's Emission Trading Programs in Dealing with Enforcement Problems*

Although China implemented the emission trading programs to address its environmental problems—including air pollution—it did not receive the same satisfactory results as the United States' SO₂ program. Actually, unlike the U.S. programs, the strong government manipulation and control over the emission trading programs and the defective monitoring mechanism prevent the current pilot emission trading programs from operating in the same way as true market-based programs. Despite these flaws, the Chinese government still decided to expand the emission trading programs nationwide. A natural question follows from this expansion: will the expansion overcome the enforcement obstacles existing in the current system?

As described in Section II, China faces four major kinds of obstacles with regard to environmental regulation enforcement: economic, legal, political, and socio-cultural. To assess the prospect of the future emission trading programs in China, it might be helpful to refer back to these obstacles to see whether the emission programs can overcome or help reduce their impact, especially based on the analysis of the enforcement situation of the existing pilot programs.

First, the pollution emission trading program might help overcome the economic obstacles to environmental enforcement in China. As discussed previously, the Chinese government was reluctant to strictly enforce its environmental policies, lest enforcement curtail economic growth. There is a chance, however, that since the emission trading program could help maintain a balance between environmental protection and economic development, the Chinese government may have more incentives to enforce its environmental policies under the emission trading regime.

Second, the emission trading programs will still face legal obstacles, such as the lack of a clear legal framework and

effective judicial enforcement. As discussed in the previous subsection, China's current emission trading programs generally face the problems of lacking clear rules and having conflicting policies. Also, when there is non-compliance, the limited role of the judicial system will come to undermine enforcement as well. These kinds of obstacles cannot be addressed only within the context of the environmental law. Instead, it is a problem which should be addressed within the broad context of China's legal and judicial reforms. Only with a clearer legal framework and a sound judicial system can China ensure sufficient monitoring and sanctioning mechanisms for non-compliant activities in emission trading programs for environmental protection.

Third, the emission trading programs might suffer less political obstacles compared to the traditional command-and-control programs. As previously discussed, policy choices regarding environmental regulation are mainly made by political parties and thus tend to be highly politicized.¹⁸¹ Therefore, when a program is "both economically efficient and politically acceptable,"¹⁸² it is more likely that such a program will overcome political obstacles. Currently, the Chinese central government places strong emphasis on the emission trading programs. This is largely due to the fact that these programs have the potential to effectively balance the interests of the economic development of local government, individual enterprises, and the public concern of environmental protection. Accordingly, local governments are more likely to cooperate with the central government in implementing the emission trading policies.

Also, since the emission trading programs can generate some income for local governments, they can help alleviate the fiscal tension faced by the local governments. In other words, these local governments do not need to worry about diverting their other income to address environmental problems because the income from granting emission permits can fill in the gap. For example, the guidelines issued by some local governments for their pilot emission trading programs specifically stated that the

181. See Joskow & Schmalensee, *supra* note 96, at 38.

182. See *id.* at 39.

proceeds from the auction or sale of emission trading rights could be used to solve specific pollution problems or implement other environmental protection measures.¹⁸³ And yet, the government should be very cautious about the tendency of abusing the power of issuing emission permits, for it could end up issuing too many permits. It was reported that some cities have already encountered the oversupply of emission permits. For example, “Shenzhen’s issued permits [for CO₂ emission] are likely to exceed forecasted emissions by 10 million [tons] over the three years between 2013 and 2015.”¹⁸⁴

In addition, as discussed previously, the current pilot emission trading programs still possess the features of a command-and-control program in the sense that the government exerts too much control over the trading market, and the market participants are not really engaging in free trade of their emission rights. Therefore, in order to actually benefit from the advantages of the emission trading programs, the Chinese government needs to follow market rules to run the programs.

Fourth, the emission trading programs might face less socio-cultural obstacles than the traditional programs. As discussed in Section I, as China’s pollution problems became more serious, the public paid more attention to the problem and became more supportive of environmental initiatives. From this point-of-view, China’s emission trading program might receive more public support if the Chinese government implemented it on a nationwide basis. But few people have sufficient knowledge to understand the emission trading practice and the public might not have a meaningful role in this practice. In addition, since China still lacks strong NGOs committed to environmental protection, when emission trading markets do not work properly,

183. See, e.g., GUIDELINES FOR EMISSION TRADING PILOT PROGRAMS IN GUI ZHOU, *supra* note 149, art.8 (stating that the fees collected from issuing emission trading rights could be used for the governments’ pollution infrastructure construction, re-purchase of emission trading rights, development of emission trading platform etc.).

184. Shenghao Feng, *Emissions Trading in China: Risky, Difficult, but Necessary*, THE CONVERSATION (June 25, 2013), <http://theconversation.com/emissions-trading-in-china-risky-difficult-but-necessary-13891>.

there is still a lack of sufficient outside supervision via public interest cases or media attention.

VI. CONCLUSION

China's enforcement problem in environmental protection has been the strongest obstacle in resolving China's environmental problems, including its serious air pollution problems. Considering the eminent necessity for China to address such problems, this paper analyzed the enforcement obstacles caused by economic, legal, political, and socio-cultural reasons respectively.

This paper then explored the theoretical foundations of the emission trading mechanism to understand whether this market-based approach could help solve enforcement problems faced by environmental regulation. Findings from the theoretical analysis support the conclusion that emission trading programs could potentially help improve participation enforcement as well as compliance enforcement of environmental regulations. This theoretical conclusion is supported by the empirical evidence of the United States' SO₂ emission trading program, a program which has achieved great success in both participation enforcement and compliance enforcement.

When turning to China's experience with trading emission programs, however, this paper finds that although China achieved some partial success in implementing the programs, it still faces several challenges for both participation enforcement and compliance enforcement. Moreover, even if China expanded the emission trading programs nationwide, it might still face existing legal and social obstacles. But this paper concludes that the emission trading programs do have the potential to reduce the economic and political obstacles that have hindered previous environmental regulations. Therefore, as long as China establishes a more sound legal and judicial system and allows more social involvement in environmental protection, the emission trading approach should be a viable solution to China's air pollution problems.