Practices and Prospects of Emission Trading Programs in China

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Abstract: In recent few years, market economy mechanism in China has gradually established, and market based policy tools were attached more importance than ever before. As China economy has been growing fast with an annually increasing ratio of about 9.8% in the past three decades, its environmental problems are mostly getting worse. In the future, more environmental restraints would be imposed on the economic development, and bigger pressures of major pollutants reduction will be ensued, so policy innovation of environmental pollution prevention and control should be impeded. Emission trading pilot projects has emerged in China since late 1980's, but advanced very slowly. However, with great efforts in environmental protection of the governments these years, environmental monitoring and supervision and management capacities have been greatly increased, in particular in some sectors or regions, and with these years pilot projects exploration, lots of policy implementation experiences of emission trading also gained. Under such backgrounds, pollution emission trading programs developed rapidly especially since 2007, though the happened emission trading case mostly concentrated on SO_2 emission trade in the fire power generation industry, and COD emission trade in some small and medium-sized basins, development trends of emission trading has become vigorous. This paper reviewed systematically practices and progresses of atmosphere and water pollutants emission trade in China during the past two decades, several key issues influencing the advancement of emission trade pilot projects were identified and discussed, the results showed main factors influencing emission trading programs are the shortage of supporting laws and rules, imperfect initial pricing and allocation methods of the emission permits, lower capacities of pollution monitoring and supervising and management, less market scale of emissions trading , and the vague relationship of emissions trading policy with other related environmental policies. And lastly, the paper proposed the pilot roadmap for implementing emissions trade.

Keywords: *Emission trade, market based instruments, environmental economic policy, evolution and trends, strategic action routes*

1. Introduction

Emission trading, that originated from some American economists academic theory early in 1960s (Crocker,1966; Dales,1968), has been practiced and now evolved into an important environmental economic policy and an important approach to reducing pollution(David,1997; UEPA,1991;Reuters,2007) in many countries and is also a part of the global cooperative scheme in greenhouse gas reduction(Stewart,2007; Risa,2008). As China continues with the

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construction of a market economy system, environmental policies and approaches are going through a gradual transition from a stage that features in the predominant application of administrative control measures to a stage that relies more on the market mechanism to achieve the goal of energy conservation and emission reduction. Thanks to the significant progress over the recent years in the implementation of the total emission control and energy conservation and emission reduction strategies, China has had in place the political and institutional circumstances required for the operation of the emission trading mechanism. Governmental authorities at all levels attach great importance to and launched emission trading programs to search for solutions to more effective configuration of environmental capacity resources at lower social costs.

2. Practices of Emission Trading in China

To China, emission trading is a completely foreign and imported environmental economic approach with an evolution of nearly 20 years. Evolution of emission trading in China can be roughly divided into three stages.

2.1 Stage of Start-up & Attempts (1988 --- 2000)

Practice of emission trading in China can be traced back to as early as late 1980's. In 1987, paid transfer of emission allowances between enterprises was practiced in Minhang District, Shanghai; On March 20, 1988, the State Environmental Protection Administration(SEPA) promulgated and enforced the Provisional Measures on Management of Water Pollutant Emission Permits, which stipulated in Article 21, Chapter IV that "the total emission allowances for water pollutants may be flexibly distributed among the emission entities in the same region"; in 1991, under the direction of SEPA, 16 cities were selected for the experimental practice of the air pollutant emission permit system followed by another 6 cities including Baotou, Kaiyuan, Liuzhou, Taiyuan, Pingdingshan and Guiyang that have piloted the trading of air pollutant emission rights since 1994 and gained some rudimentary experiences.

In 1996, the "National Plan for Total Emission Control of Major Pollutants during the "9th Five-year Plan' Period" (1995-2000) submitted by the State Environmental Protection Administration gained approval from the State Council, representing the official inclusion of the total amount control (TAC) policy of the major pollutants into the environmental protection appraisal objectives during the "9th Five-year Plan" period and nationwide

implementation of the emission permit system in Chinese cities. Nationwide enforcement of the total emission control and emission permit policies laid an institutional foundation for practice of and provided the soil for the rooting of emission trading in China. The Law on Prevention of Atmospheric Pollution adopted by the 9th Session of the National People's Congress on April 29, 2000 provided legal assurance for the true transition of the focus of the national pollution control strategy from concentration control to total emission control and correspondingly defined the legal status of the emission permit system.

In this Stage, to sum up, documented policies and cases of emission trading implementation came into existence primarily thanks to the efforts of facilitation by the national environmental protection authorities; these efforts were focused on initial experiments and attempts in emission trading of air pollutants and some beneficial experiences were gained, laying a foundation for further development of emission trading in the following piloting stage.

2.2 Stage of Experiments & Researches (2001 --- 2006)

During the "10th Five-year Plan" period (2001-2005), China fully shifted its focus of environmental protection efforts to total emission control. In order to better align the environmental protection efforts with the needs of economic development, SEPA proposed the enforcement of the emission permit system and emission trading pilot projects respectively to facilitate and improve the total amount control of the major pollutants.

In such a context, quite a few pilot projects were launched around 2001, such as the China-US Environment Partnership Projects of "Feasibility Study in Application of Market Based Mechanism in Reduction of SO_2 Emission in China" and "Study in Facilitating the Implementation of Policies on Total Emission Control and Emission Trading of SO_2 in China", the ADB pilot project of "SO_2 emission trading within the territory of Taiyuan City" and developed the "Management Methods of SO_2 Emission Trading in Taiyuan" with the aid of ADB, as well as "the emission trading pilot project in Nantong city" executed by U.S. Environmental Defense Fund (EDF). Driven by these projects, multiple cases of emission trading were carried out and rich practical experiences were gathered. In 2002, supported by U.S. Environmental Defense Fund (EDF), SEPA issued the "Notice on Implementation of the Demonstrative 'Study in Facilitating the Implementation of Policies on Total Emission Control and Emission Trading of SO_2 in China'" and launched pilot projects in 7 provinces and cities including Shandong, Shanxi, Jiangsu, Henan, Shanghai, Tianjin and Liuzhou. In

May 2006, a joint study in emission trading was conducted by the Ministry of Finance (MF) and SEPA in some provinces and cities. Expert panel discussions were held and the financial and environmental protection authorities of Shanghai, Jiangsu, Zhejiang, Tianjin, Shanxi, Henan, Guangdong, Fujian and Guangxi and State Grid, China Southern Power Grid and the top five power group corporations and some local power companies were consulted. It was agreed that the electricity sector has clear emission performance and proven SO_2 treatment technologies and is suitable to carry out the nationwide pilot projects of emission trading.

Experiments in water pollutants emission trading also made some progress in this stage. In 2001, for example, Xiuzhou District of Jiaxing, Zhejiang promulgated its "Provisional Measures for Total Emission Control and Emission Trading of Water Pollutants" and started the paid use of the initial emission rights of water pollutants. In 2006, Jiaxing City started the citywide implementation total emission control and emission trading. In Jiangsu Province, the Provincial Environmental Protection Commission issued in 2004 the Notice on Issuing the Work Program on "Experimental Study in Paid Allocation and Trading of Emission Rights of Water Pollutants in Jiangsu Province". However, the efforts in experimental research in emission trading for water pollutants are relatively weaker than those for air pollutant SO_2.

Generally speaking, emission trading in this stage was primarily operated with the "matchmaking" efforts from the governmental departments. However, the potential role of emission trading policies and mechanisms came to light as continuous efforts were made in such experiments and researches. Shown in Table 1 as follows are the major events and cases of emission trading in this stage.

Table 1- Major events and activities of emission trading in China

Time	Events and Activities
1987	China started the experimental issuance of water pollutant emission permits.
	Transfer of pollution emission rights was carried out between Shanghai No. 10 Steel & Iron Plant and Tangwan Electroplating Factory in Minhang District, Shanghai. A compensation of RMB40,000 was paid per year to the Tangwan Electroplating Factory.
	Emission trading was carried out between the newly established Shanghai Yongxin Color Kinescope Co., Ltd. and Shanghai Hongwen Paper Mill, with the former buying an emission permit of 395kg COD per day from the latter.
1987 till now	Emission trading for water pollutants starts in Minhang District, Shanghai and 37 such deals have been fulfilled so far, involving the transfer of the rights to emit 1301kg of COD per day with a trading amount of RMB13,910,000 in total.
March 1988	SEPA promulgated the "Interim Measures on the administration of Water Pollutants Emission Permit".

June 1988	18 cities including Shanghai, Beijing, Tianjin, Shenyang, Xuzhou, Changzhou were selected by SEPA to pilot the application of water pollutant emission permits.
July 1989	It is stipulated in Article IV of the Detailed Rules of Implementation of the Law on Prevention of Water Pollution that enterprises and public utilities emitting pollutants to water bodies shall be managed using emission permits.
1990	SEPA began to select cities for pilot projects of the air pollutants emission permit system and 16 cities including Baotou, Liuzhou, Taiyuan, Pingdingshan and Guiyang were selected.
April 1991	SEPA started the pilot enforcement of the air pollutant emission permit system in 16 selected cities.
1993	The Municipal Government of Kaiyuan, Yunnan Province promulgated the "Interim Measures on the administration of Air Pollutant Emission Permits in Kaiyuan City" and the Municipal Environmental Protection Administration staged the "Methods for Management of Emission Trading for Air Pollutants in Kaiyuan" to practice total emission charge and emission trading of SO_2, flue gas and dust. Liaoning Province stipulated in its local laws that all pollutant emission entities should be subject to permit management.
1994	SEPA started pilot enforcement of emission trading for air pollutants in 6 cities of Baotou, Kaiyuan, Liuzhou, Taiyuan, Pingdingshan and Guiyang. SEPA announced the ending of the pilot enforcement of emission permit and started to enforce such permits in all the cities.
1995	The State Council promulgated the "Regulations on Prevention and Control of Water Pollution in Huaihe River", which stipulates in Article XIX that organizations holding an emission permit …… in Huaihe River Basin shall make sure that their total emission shall not exceed the total emission allowances specified in such permits.
September 1996	The State Council officially stated in the "National Plan for Total Emission Control of Major Pollutants during the '9th Five-year Plan' Period" that total emission control shall be an environment policy of China, laying an institutional foundation for the implementation of emission trading in China.
1997	Beijing Institute of Environment and Development and U.S. Environment Defense Fund launched an emission trading research project and Benxi and Nantong were selected as the candidate cities for Phase 1 to conduct case studies in city-level emission trading. In Xiuzhou District of Jiaxing, the authorities of environmental protection, price management and finance jointly promulgated its "Provisional Measures for Total Emission Control and Paid Use of Emission Rights for Water Pollutants". Xiuzhou District Wastewater Treatment Co., Ltd. is responsible for collecting operating charges for paid use of the emission rights and all the revenues shall be used in construction of township domestic wastewater treatment plants for the whole district.
August 1998	Taiyuan passed its "Management Methods of Total Emission Control of Air Pollutants", China's first local law on total emission control that contains provisions on emission trading.
April 1999	Mr. Xie Zhenhua, Director of the State Environmental Protection Administration, and Ms. Carol Brown, Administrator of U.S. Environmental Protection Agency, signed the Agreement on Cooperative "Feasibility Study in Application of Market Mechanism in Reduction of SO_2 Emission in China" during Premier Zhu Rongji's visit to the U.S and Nantong of Jiangsu Province and Benxi of Liaoning Province were defined as the pilot cities.
September 1999	SEPA and U.S. Environment Defense Fund signed a memorandum on the cooperative agreement on "a study in how to use market mechanisms to help local governments and enterprises achieve the total emission control targets set by the State Council".
November 1999	The "International Forum on Feasibility of SO_2 Emission Trading in China" was held at Beijing International Conference Center jointly by SEPA and U.S EPA.
March 2000	The revised "Rules for Implementation of the Law on Prevention and Control of Water Pollution" stipulated in Article X that local environmental protection authorities shall issue water pollutant emission permits based on the total emission control implementation plan.

April 2000	The revised "Law on Prevention of Atmospheric Pollution" stipulated in Article XV that areas with noncompliant air quality and subject to control of SO_2 and acid rain as defined by the State Council shall practice total emission control of major air pollutants and emission permits for air pollutants. This law provided the legal basis for the total emission control policy.
October 2000	A 15-people delegation sent by SEPA, the State Planning Commission, China Academy of Environmental Science and the environmental protection administrations of Benxi and Nantong cities took a study tour to the U.S.A for SO_2 emission trading and convened, together with U.S EPA, "the 2nd China-US Forum on Controlling SO2 Emission through Market Mechanism".
November 2000	An agreement was secured between Dongyang and Yiwu in Jinhua Prefecture of Zhejiang Province on paid transfer of water right. According to the agreement, Yiwu paid RMB 200 million to buy the permanent right to use the water resources of 50,000,000m^3 in total in Hengjin Reservoir in the neighboring Dongyang. This is the first cross-city water right trading in China.
2001	A number of forums on SO_2 emission reduction and trading were held by SEPA, State Power Corporation and U.S EDF in Huangshan of Anhui Province and Beijing and Nanjing.
September 2001	ADB and Shanxi Provincial Government jointly launched the Project of "SO_2 Emission Trading Mechanism". This Project was jointly executed by Resources for the Future (RFF), a U.S research organization, and the Environment Planning Research Institute under China Research Academy of Environmental Sciences (CRAES). Taiyuan was selected as the case city and 26 large enterprises participated in the demonstration project. With the aid of RFF and the Environment Planning and Research Institute of CRAES, Taiyuan issued its "Measures for the administration of SO_2 Emission Trading", China's first local regulation on SO_2 emission trading. A contract for paid transfer of the emission rights of 1,800 tons of SO_2 was signed between Nantong Tianshang Port Power Generation Co., Ltd. and Nanjing Acetate Fiber Plant. The contract is valid for 6 years.
2002	Taicang Huanbao Power Generation Co., Ltd. purchased the emission permit of 1700 tons of SO_2 per year from Nanjing Xiaguan Power Plant for the years from 2003 to 2005. A "Joint Declaration on Improving the Air Quality in Pearl River Delta" was made by the Government of Hong Kong SAR and the Government of Guangdong Province. According to the Declaration, SO_2 emission shall reduce by 30% in both areas by 2010 and emission trading shall become one of the main approaches to cut air pollutant emission in both places.
March 2002	SEPA issued the "Notice on Implementation of the Demonstrative 'Study in Facilitating the Implementation of Policies on Total Emission Control and Emission Trading of SO_2 in China'" and launched experiments in total emission control and emission trading of SO_2 in 7 provinces and municipals including Shandong, Shanxi, Jiangsu, Henan, Shanghai, Tianjin and Liuzhou, the largest demonstration on emission trading ever launched by the Chinese government.
May 2002	SEPA issued the "Notice on Plans for Demonstrative Enforcement of Policies on Total Emission Control and Emission Trading of SO_2" and launched, in partnership with U.S EPA, the Project of "Experiments on Total Emission Control and Emission Trading" in 7 provinces and municipals.
June 2002	Xiuzhou District of Jiaxing City pioneered the experiment on emission trading. All pollutant emission enterprises were required to buy "initial" emission rights and the emission trading mechanism was introduced.
July 2002	A meeting was held by SEPA on the experiments on "SO_2 emission trading" implemented in 7 provinces and cities. At the meeting, specific steps and plans for the implementation of such experiments were determined.
September 2002	The "10th Five-year Plan for Pollution Prevention and Control in the Acid Rain and SO_2 Control Areas" enforced at the approval of the State Council specifies that the system of SO_2 total emission control and emission permit shall be put into practice in such areas.
October 2002	The People's Government of Taiyuan Municipality staged its "Methods for Management

	of SO_2 Emission Trading" (Trial Version), the first such regulation issued at the city level. The Environmental Protection Department and the Economic and Trade Department of Jiangsu Province jointly established the "Interim measures for the administration of SO_2 Emission Trading in the Electricity Sector of Jiangsu Province".
October 2002	11 enterprises from Honghe and Wangdian townships of Xiuzhou District known for concentration of wool sweater dying firms attended the start-up ceremony of the paid use of emission rights as the first group of users in Xiuzhou District. These enterprises achieved a contract trading amount of 1,435,900 RMB in total.
2003	With the efforts of coordination by the Environmental Protection Bureau (EPB) of Henan Province, Yima Coal Gas Company of Sanmenxia City, Henan Province entered into a contract to buy the emission allowance of 900 tons of SO_2 from Zhongyuan Gold Smelting Plant. Guodian Changzhou Power Generating Co., Ltd. purchased, at a price of 3,000,000 RMB per year, the emission permit of 2,000 tons of SO_2 per year from Zhenjiang Jianbi Power Plant in Nantong for the years from 2006 to 2010.
March 2003	Xie Zhenhua, Director of SEPA, announced at the 11^{th} Meeting of the 10^{th} National People's Congress that China started to practice emission trading of SO_2 in some key areas.
April 2003	A cooperative training program on SO_2 total emission control and emission trading was jointly launched by SEPA and U.S Environmental Defense nationwide.
July 2003	Taicang Port Huanbao Power Generation Co., Ltd. buy the emission allowance of 1,700 tons of SO_2 per year from Xiaguan Power Generation Plant. Such allowances are to be used up within 2 years.
December 2005	It is stipulated in the "Decisions on Implementing the Scientific Development Outlook and Strengthening Environmental Protection" that a system of total emission control and emission permit shall be practiced and Pilot projects of emission trading shall be implemented.

2.3 Stage of Further Development of the Pilot projects (2007 ---)

Along with the shift of the National Environmental Protection Strategy from the traditional administrative control approaches to the integrated use of administrative, legal and market and voluntary approaches, governments at all levels attached greater importance to the fundamental role of the market in configuration of environmental resources over the recent years and the application of environmental economic policies received more attention. SEPA launched the pilot project of national environmental economic policies in 2007 to study and explore for policies of green credit, environmental insurance, green trade, environmental tax, ecological compensation and emission trading. Correspondingly, the local governments also showed special interests in the role of emission trading system in energy conservation and emission reduction.

Emission trading in this stage is obviously unique in that it received higher recognition by the National Government, voluntary and active explorations were conducted by the local governments, the connection between the upper and lower levels is consolidated, explorations were carried out for diversified trading models, the scope of trading objects was

widened, the space level of the policy was promoted on a continuous basis (to four levels, namely, the national level, the basin level, the regional level and the local level), local laws and policies were issued at a greater frequency, cooperative efforts in scientific research were given prior attention and companies specialized in emission trading appeared. Table 2. listed the recent events related to practices of emission trading. Regarding the cooperative projects of environmental protection, for example, the 3rd Session of China-US Strategic Economic Dialogue (SED) held at the end of 2007 identified the cooperative project of SO_2 emission trading in the electricity sector; Zhejiang Province adopted a "top-down" model in the exploration of new trading patterns and measures for the administration of emission trading of major pollutants were promulgated successively in Hangzhou, Jiaxing, Zhuji and Tongxiang; In Jiangsu Province, however, a "bottom-up" model was adopted and emission trading was gradually implemented in the Tai Lake basin and some cities and prefectures under the guidance of the Provincial Environmental Protection Bureau.

Attracted by the business opportunities hidden behind the emission trading policies, companies engaged in commercial operation of emission trading emerged and active and cooperative efforts were made by the local governments to co-build emission trading platforms. The scope of trading objects is also wider and no longer limited to the major pollutants subject to the total emission control policy of the national government. It has been even expanded to all tradable objects involving environmental rights and interests. In May 2008, for example, Tianjin Property Rights Exchange, CNPC Assets Management Co., Ltd. and Chicago Climate Exchange (CCX) joined hands to prepare for the establishment of Tianjin Climate Exchange, which is engaged in trading of not only SO_2, COD and other traditional pollutants, but also the greenhouse gas emission permit, development technologies and other quantifiable, quota-based and standardized trading products. On August 5, 2008, China Beijing Environment Exchange and Shanghai Environment & Energy Exchange were established on the same day and the trading objects also cover a wide range of environment right products. Although the operability of such platforms is yet to be verified in practice, experiments and explorations for emission trading in this stage have marched a large step forward compared with the previous stage when the experiments of emission trading were conducted under the guidance of the environmental protection authorities.

In spite of the fact that emission trading experiments have been practiced in China for a period of nearly 20 years and developed greatly, problems of emission trading still exist in

many aspects and an institutional emission permit mechanism is still not shaped. To set up the emission permit system requires not only a long period efforts but also a close connection with the direction and progress of development of the various social elements in the course of reform in China.

From the perspective of the development of emission trading policy, emission trading will transit into a stage of institutionalization, scale escalation and diversification for a certain period of time in the future. It will have the following characteristics in terms of development trends:

- The national government will make greater efforts in policy pilots and institutional standardization;
- Voluntary explorations and practices will grow vigorously at the local level;
- Some commercial companies aiming to engage in emission trading will be established and make profits from the emission trading platforms and services they provide;
- The emission allowances shall be allocated and used primarily on a paid basis reflecting the scarcity and value of the environment capacity resources. However, it is still a problem as to how to define the price of the initial emission allowances in a reasonable way and with guaranteed fairness;
- The scope of trading objects will expand to include not only SO_2, COD and other major pollutants but also the other environmental rights and interests products. However, in the near future, the tradable objects shall be primarily the major conventional pollutants and the emission reduction allowances for greenhouse gasses and other environment right and interest products will gradually be included into the list of trading objects.

Table 2- Evolution of Emission Trading as of 2006

Time	Events	Policy Scope	Policy Objects
March --- June 2006	Joint study in paid acquisition of emission permit and emission trading by the Ministry of Finance(MF) and SEPA	Nationwide	
August 30, 2006	City University of Hong Kong hosted a Symposium entitled "Emission trading in China: from concept to implementation"	Hong Kong electricity sector	
January 30, 2007	Governments of Guangdong and Hong Kong promulgated "Plan for Experiments in Emission Trading for Thermal Power Plants in Pearl River Delta"	Region (Pearl River Delta)	Mainly SO_2, also including NO_x, PM_{10}
March 2007	"Technical Study in SO_2 Emission Trading in Electricity Sector", a study task under the National Key Technology R&D Program,	Electricity sector nationwide	SO_2

	was launched.		
April 29, 2007	First SO_2 emission trading was carried out in Wuhan, Hubei Province	Region (Wuhan)	SO_2
July 1, 2007	MF and SEPA decided to select the electricity sector and Tai Lake basin for experimental emission trading		SO_2, COD, ammonia nitrogen
June 7, 2007	State Council requires in the "Comprehensive Work Plan for Energy Conservation and Emission Reduction" that administrative rules and regulations regarding SO_2 emission trading be established at the earliest possible date.	Electricity sector nationwide	SO_2
Aug. 13, 2007	Zhuji of Zhejiang Province promulgated its "Temporary Provisions on Paid Use of Total Emission Allowances in Zhuji".	Regional (Zhuji)	COD, SO_2
Aug. 29, 2007	Zhuji of Zhejiang Province promulgated the Detailed Rules of Implementation of the "Temporary Provisions on Paid Use of Total Emission Allowances in Zhuji".	Regional (Zhuji)	
September 2007	"Regulations on Prevention and Control of Water Pollution of Tai Lake in Jiangsu Province" (Revision) was adopted by the Standing Committee of the People's Congress of Jiangsu Province stipulating that experiments shall be conducted to gradually enforce the mechanism of initial paid allocation and trading of emission allowances for major water pollutants in Tai Lake drainage area.	Drainage area (Tai Lake，Jiangsu)	COD
Sept. 27, 2007	Jiaxing Municipal Government promulgates "Measures on Implementation of the Methods of Emission Trading of Major Pollutants in Jiaxing" (Trial Version).	Local (Jiaxing)	COD, SO_2
Nov. 10, 2007	Jiaxing established its Emission Allowance Reserve and Trading Center, China's first emission trading body.		COD, SO_2
Dec. 13, 2007	MF & SEPA granted approval of the experiment on paid use and trading of emission permits in Tai Lake drainage area.		Mainly COD
End of December, 2007	Jiangsu, Zhejiang and Shanghai intended to jointly conduct experiments on paid allocation and trading of emission permits in the Yangtze River Delta.	Region (Yangtze River Delta)	COD, SO_2
End of December, 2007	Cooperative project on SO_2 emission trading in electricity sector was determined on the 3rd Session of China-US Strategic Economic Dialogue (SED).	Nationwide	SO_2
January 1, 2008	"Measures for the administration of Charges on Paid Use of Emission Allowances of Major Water Pollutants in Tai Lake Drainage Area in Jiangsu Province" (Trial Version) was put into implementation.	Tai Lake Drainage Area, Jiangsu	COD, ammonia nitrogen, TP

January 1, 2008	"Measures for the administration of Charges on Paid Use of Emission Allowances of SO_2 in Jiangsu Province" (Trial Version) was put into implementation.	Region (Jiangsu)	SO_2
January 23, 2008	"Measures for Implementation of Paid Use and Trading of Emission Permits in Shaoxing" (Trial Version) was approved by the Municipal Government of Shaoxing, Zhejiang Province	Local(Shaoxing of Zhejiang Province)	COD, SO_2
March 2008	Wuhan Optics Valley Limited Property Rights Exchange plans to establish emission trading platform to introduce emission trading into the Exchange.	Region (Hubei)	COD, SO_2
March 17, 2008	State Electricity Regulatory Commission promulgates "Provisional Methods for the administration of Trading of Power Generation Right.	Nationwide	Trading of power generation quota
March 25, 2008	"Methods for the administration of SO_2 Emission Trading of Taiyuan City" were officially put into force.	Local (Taiyuan)	SO_2
May 2008	Tianjin Property Rights Exchange, CNPC Assets Management Co., Ltd. and CCX joined hands to prepare for the establishment of Tianjin Climate Exchange.	Nationwide	Quantifiable, quota-based and standardized products of environmental rights and interests
May 15, 2008	The Technical Team of National Environmental Economic Policy Study and Experimental Project conducted a study in emission trading in Jiangsu and Zhejiang.	Electricity sector and Tai Lake	COD, SO_2
May 15, 2008	"Methods of Emission Trading for Papermaking Industry of Mancheng County Hebei Province" (Trial Version) was put into implementation.	Local (Mancheng County), papermaking industry	COD, SO_2
June 11, 2008	China Academy of Environmental Planning (CAEP) under the Ministry of Environmental Protection(MEP)[1] started the development of SO_2 emission trading management platform for fire power industry.	Electricity sector	SO_2
June 12, 2008	Government of Pinghu, Zhejiang Province promulgates the "Notice on Circulation of the Methods of Emission Trading of Major Pollutants in Pinghu City" (Trial Version).	Local (Pinghu City)	COD, SO_2
June 17-18, 2008	CAEP convenes the Forum on Paid Use and Trading of Emission Permits for Water Pollutants in Jiaxing Zhejiang Province.	Nationwide	Water pollutant emission trading
July 3,	Government of Haining, Zhejiang Province	Local (Haining City)	COD, SO_2

[1] On March 11, 2008, Institutional reform plans of the State Council of China promulgated that SEPA upgraded to the Ministry of Environmental Protection (MEP) ,which means the former SEPA has become a constituent units of the State Council.

2008	promulgates the "Notice on Circulation of the Methods of Emission Trading of Major Pollutants in Haining City" (Trial Version).		
Aug. 5, 2008	China Beijing Environment Exchange and Shanghai Environment & Energy Exchange were established.	Nationwide	Trading platform for various environmental rights and interests
June 30, 2008	"Work Plan on Experiments of Paid Acquisition and Trading of Emission Permits of Major Pollutants in Zhejiang Province" passed expert panel appraisal.	Region (Zhejiang Province)	COD, SO_2
Aug. 6, 2008	"General Plan on Comprehensive Experiments of Emission Trading in Tianjin Binhai New Area" passed expert panel appraisal.	Nationwide	COD, SO_2 and carbon emission tradable permits and other right products
Aug. 14, 2008	MF, MEP and the Government of Jiangsu Province jointly staged in Wuxi City the start-up ceremony for the experiment on paid use and trading of emission permits of major water pollutants in Tai Lake drainage area.	Region (Suzhou, Wuxi and Changzhou by Tai Lake and parts of Nanjing and Zhenjiang)	COD
Sept. 2, 2008	The People's Government of Nanhu District, Jiaxing City promulgated the "Methods for Management of Special Fund for Emission Trading in Nanhu District of Jiaxing City".	Local (Urban area of Jiaxing)	COD, SO_2
Sept. 10, 2008	The SO_2 Emission Trading Platform of Heilongjiang Province was established.	Region (Heilongjiang Province)	SO_2
Sept. 24, 2008	Tianjin emission permit exchange was established and conducted the public sale of the residual emission allowances of SO_2.	International (CO_2), domestic (SO_2, COD, etc）	COD, SO_2, carbon emission and environmental protection technologies, energy efficiency services, etc.
October 2008	"Methods for Trial Emission Trading of Major Pollutants of Hubei Province" (Draft) were adopted.	Region (Hubei Province)	COD, SO_2
Oct. 8, 2008	MF and MEP agrees to the proposal of Tianjin on comprehensive experiment of emission trading.	Region (Tianjin City)	COD, SO_2
Oct. 27, 2008	"Methods of Emission Trading for Pollutant Discharging Industries in Lixian County, Baoding of Hebei Province" (Trial) were promulgated.	Local (Lixian County, Baoding)	COD, SO_2
Oct. 27, 2008	The Government of Hubei Province issued a Notice on Circulation of "Methods for Trial Emission Trading of Major Pollutants in Hubei Province".	Region (Hubei Province)	COD, SO_2
Oct. 31, 2008	The Government of Huzhou City, Zhejiang Province issued the "Notice on Circulation	Local (Huzhou City)	COD, SO_2, ammonia nitrogen,

	of the Provisional Methods of Management of Paid Use and Trading of Emission Permit of Major Pollutants in Huzhou".		TP
November 2008	International Workshop on Emission Trading Programs：Policy Innovation and Business Opportunity was held in Nanjing University in Jiangsu Province jointly by CAEP, ADB, CCX among 10 organizations.		
Nov. 20, 2008	The Environmental Protection Department of Jiangsu Province issued together with other organizations the "Notice on Circulation of the Detailed Rules of the Experiments on Paid Use and Trading of Emission Permits of Major Water Pollutants in Tai Lake Drainage Area in Jiangsu Province".	Region (Jiangsu Tai Lake Drainage Area)	COD、SO_2

3. Remarkable problems emerged in the pilot projects

Although emission trading is an excellent market economy policy and China has also gained some experiences in establishing management systems and operational mechanisms of emission trading after years of experiments in these aspects, obstructions from laws and regulations, administrative departments, enterprises and environmental concepts were felt and a large number of problems(Wang,2008)were exposed in the course of further deepening and extending such experiments since the policy system itself is not fully reasonable and the supporting systems and mechanisms are not perfect. These problems are remarkably noticed in the five aspects described in the following paragraphs.

3.1 Supporting laws and regulations are inadequate

Both total emission control and emission permit policies are referred to in the "Law on Prevention of Atmospheric Pollution" and the "Law on Prevention and Control of Water Pollution" currently in force at the national level. Experiments on emission trading have been carried out successively at the local level for nearly 20 years. However, there is still not such a technical guidance on emission trading at the national level, let alone a national law on emission trading. Issues such as the contents of emission rights, rules of emission trading, responsibilities, rights and interests of the trading entities, settlement of trading disputes, tax preference and other trading incentives, mortgage of emission rights as assets, regulatory procedures, liabilities for breach of law, legal authorization in the policy of experimental emission trading, etc. still remain unsolved. To date, the only consents to experiments and studies in emission trading are expressed in the "Decisions on Implementing the Scientific

Concept of Development and Strengthening Environmental Protection" promulgated by the State Council in December 2005 and the "Comprehensive Work Scheme for Energy Conservation and Emission Reduction" and the "10th Five-year Plan for Environmental Protection" issued by the State Council in 2007.

Weak and inadequate legal basis for emission trading, in particular, the paid acquisition of emission permits, is also a problem from the perspective of the practical implementation of paid use and trading of emission allowances in the provinces and municipalities at the local level. So far, only Jiangsu and Zhejiang provinces and some other regions and cities have carried out some experiments and formulated and introduced some local laws and regulations on emission trading. In the majority of the other experimental areas, the legal basis for emission trading does not exist and the experiments are carried out in a purposeless way to a large extent. Consequently, many policies become "lawless" operations. Provinces and cities that started earlier in the practice of emission trading expect timely enactment by the national government of specific rules and regulations on paid use and trading of emission permits.

3.2 Methods for allocation of emission allowances and mechanism for initial pricing are imperfect

Despite some experiences obtained in the methods of allocation of emission allowances to enterprises and significant improvements made to the fairness and impartiality of such methods, the performance-based allocation method is not yet practiced locally, the method for obtaining the emission allowances of new pollution sources is not yet identified and no specific enterprise access standards and regulations are established. These problems will become the obstacles to the implementation of emission trading mechanism.

In addition, a scientific mechanism is not in place for initial pricing of tradable emission permits. Significant disputes still exist during the experiments over initial pricing of the environmental capacity resources adopting the mechanism of paid use to reflect the scarcity of which. Excessively low initial price fails to materialize the restrictive function of environmental capacity resources upon emission entities while excessively high initial price will overburden enterprises in the experimental areas and, consequently, lead to governmental rent seeking. The current practice in this regard is that the initial price for paid use of emission allowances is, in most of the cases, defined jointly by the authorities of environmental protection, price administration and development & reform committees. The

low level of participation in the allocation of the initial emission allowances by the enterprises, as the objects of such allocation activities, has become one of the obstacles to policy enforcement.

3.3 The power of pollutant emission monitoring, supervising and management required for the implementation of emission trading are still inadequate

Accurate measurement and monitoring of the level of emission at the pollution sources and a powerful regulatory and law enforcement system become important assurance of the implementation of paid acquisition of emission rights. Presently, the infrastructures for measurement of pollutant emission are relatively underdeveloped and the regulatory ability of the environmental protection departments is inadequate. The monitoring conditions required for the enforcement of this policy are not available in many areas. As a result, the environmental protection authorities find it difficult to get the true emission data from the pollutant emission entities and track and verify transactions. The effectiveness of policy enforcement is severely challenged.

How to achieve timely tracking and supervisory management of the paid use of pollutant emission permit, issuance of emission permit and status of emission trading remains one of the issues that the governmental authority needs to study and solve with great efforts. In addition, from the perspective of regulation and law enforcement, the emission trading policy requires the environmental protection authorities to have a relatively high level of competence to regulate the illegal acts of the pollutant emission entities. Slack law enforcement by relevant authorities brings high risks to the enforcement of the emission trading policies.

3.4 Significant expansion of emission trading market is difficult to achieve in the short term

Most of the emission trading carried out in the past cannot be fully classified as a market based transaction because they were achieved with the coordination of the local environmental protection authorities. The environmental protection authorities are the maker of the trading rules and the intermediary in these trading cases. So far, no enterprises or professional intermediaries are playing the role of a broker. Such an arrangement in which the government plays a “matchmaking” role carries a taste of “guiding price” under very strong administrative interferences and is not linked with the market price mechanism,

resulting in the failure of the price leverage and competition mechanism and an unhealthy pricing mechanism for emission trading, which, consequently, fails to show the scarcity of the environmental capacity resources. Therefore, in fact, China still does not have in place an emission trading market in the true sense and enterprises still find an ambiguous future for the allocation of total emission allowances and trends of emission trading prices. This situation tends to lead to a problem, that is, enterprises in possession of the emission allowance incline to preserving for the good of their own business, the result is the emission permit buyer always on the market but no seller could be found. This is one of the important causes of the slow development and low trading volume of emission trading market in China.

In order to establish a market mechanism of emission trading, the national policies must be so established that incentives are provided to assure adequate circulation of residual emission allowances on market. This is essential to the establishment and sustainable operation of an emission trading market in the true sense. Otherwise, if there are very small quantities of residual emission allowances or emission reduction credits for sale on market, the emission trading market will fall into a trap of "zero supply" featuring in plentiful buyers but few sellers. The major factors affecting the growth of the trading market are:

- The government enforces the inflexible "one-size-fits-all" emission reduction policy and a great majority of the enterprises have heavy emission reduction tasks to fulfill and find it very hard to make a flexible choice to sell or not to sell it's residual emission permits into market;
- Since energy demand keeps soaring nationwide while the medium and long term objectives and policies of emission reduction remain ambiguous, electricity enterprises are not willing to sell and prefer preserving their residual emission allowances for their own good;
- The local emission trading market is severely segmented administratively and the scale development of the trading market for emission allowances for cross-region trading, such as SO_2 in particular, will be badly hindered with emission trading platform set up by a single city or province.

3.5 The relationship with the existing environmental policies is not clear

There are a great deal of environmental policies regarding pollution source management, e.g. pollutant emission charges, wastewater treatment charges, environmental impact assessment, total emission control and emission permit. In order to enable the emission trading policies to be integrated into the environmental policy system, the impacts produced by such policies on other policies in force and the relationship between them shall be identified. So far, no

in-depth study has been carried out in this regard and no evaluation has been carried out from the perspective of the environmental policy system on the position and function of emission trading policies. In many places, the experiments of emission trading mechanism were conducted on a "learn-as-we-go" basis without clear knowledge. Therefore, the relationship between emission trading and the existing environment management system must be figured out at the theoretical and operational levels to achieve the complementation goals between emission trading and the related environmental policies.

4. Basic Thoughts on Establishment of Emission Trading System in China

Domestic and international experiences in emission trading reveal that emission trading is an approach with strong contribution to emission reduction. In face of the severe situation of emission reduction, China is in urgent need of an emission trading mechanism to achieve emission reduction at minimum social costs and establish a lasting and efficient mechanism of energy conservation and emission reduction. In addition, emission trading provides reserved policies for China to build its competence to cope with climate change. Therefore, the Chinese government must highly recognize the importance of the emission trading policies and design reasonable action roadmap to continuously advance the policy and make break-through progress in settlement of key problems. Supporting measures should be provided and greater efforts made in pilot projects of emission trading so as to build up and gradually shape an emission trading system that fits the specific situation of China.

4.1 The emission trading system shall be implemented in a phased and orderly way with break-through progress in key sectors and regions

Reasonably designed environmental policies shall be enforced on an experimental and demonstrative basis so that relevant experiences are gathered to facilitate extensive enforcement. This is an important "trump" for China to attain effective enforcement of its environmental policies. The order of priority of the experiments shall be arranged based on the finished activities as well as the level of urgency of the respective problems. Taking account of the total emission control policies for the "11^{th} Five-year Plan" (2005-2010) and the coming "11^{th} Five-year Plan"(2011-2015)periods, emission trading in the near future shall focus on SO_2 emission trading in the electricity sector nationwide and the experimental emission trading of COD in Tai Lake basin. Local experiments in emission trading for small basins shall be encouraged.

The electricity sector, known for its significant emission of SO_2 that accounts for more than 50% of the total SO_2 emission nationwide, is a major contributor to acid rain pollution in China. The electricity sector has had the conditions and infrastructures for efficient reduction of SO_2. For a power plant using fuel coal of different sulfur contents, its marginal cost difference for SO_2 treatment may be doubled or even larger and cost difference will become a major driving force for the electricity sector to carry out experiments in emission trading. In order to encourage the electricity sector to make more efforts in emission reduction and encourage enterprises to take incisive control actions to settle the conflicts between the development of electricity sector and the limited emission allowances, it is very essential to pilot SO_2 emission trading in the electricity sector. Besides, above 70% national controlled key pollution resources of the fire power generation plants equipped with the online Continuous Environmental Monitors (CEMs) at the bottom of 2008. Under such circumstances, both the MEP and MF have explicitly required the electricity sector to pilot SO_2 emission trading. Therefore, the "Measures for the administration of SO_2 Emission Trading in the Electricity Sector" should be issued at the earliest possible date, the policies and supporting measures for the SO_2 emission trading in the electricity sector should be improved and established and greater efforts should be made in the enforcement of the respective policies. Experimental ranges should be extended to other sectors when the conditions are mature; experimental ranges of emission trading shall be considered for chemical industry, construction materials and steel and iron and other sectors with relatively big proportion of SO_2 emission other than the fire power generation sector; "Guidance for SO_2 emission trading in non-electricity sectors" should be promulgated, greater research efforts should be made to explore for models of emission trading for NOx and Hg pollutants and study the feasibility and operating models for extending emission trading to greenhouse gases, land production equivalent quota, renewable energy quota, natural reserves (forests) quota and experimental projects should be carried out.

COD emission trading should be implemented in the Tai Lake basin in the near future under the guidance of the MF and MEP. In the early stage, experimental areas may be conducted in a number of small basins or regions around Tai Lake in Jiangsu and Zhejiang that have a relatively sound basis of pollution source management. Then, based on the experiences obtained from these experiments, gradual improvements can be made to the management mechanism and methods for paid acquisition and trading of COD emission permits and the territorial scope of such experiments can be further expanded to get ready for

nationwide implementation of emission trading policies for major water pollutants in small and medium-sized drainage areas. Meanwhile, experiments on emission trading of nitrogen, phosphate and other water pollutants may be conducted in Tai Lake area in parallel with the national key technology R&D program in prevention and control of water pollution, the national research and pilot program on environmental economic policies and other S&T programs.

4.2 Greater efforts shall be made in the construction of the six systems in emission trading

The key elements that affect the implementation of emission trading in China are multidimensional, including the fair allocation of the emission permit (primary market) and the trading efficiency of the permit trading market(secondary market), the correlated impacts and connection between the policy with the other related policies, as well as regulatory and law enforcement guarantees, competence building for technical staffs, supply of trading platform, readiness of laws and regulations and policies. These elements are sequentially dynamic and spatially heterogeneous. Therefore, efforts in the near future should focus on the construction of “six systems”:

A key technical supporting system shall be developed to provide technical assurances needed for smooth policy enforcement. There are many technical difficulties to overcome to achieve effective implementation of the emission trading policy. These technical issues directly affect the effectiveness and impartiality of policy enforcement. Therefore, the R&D progress should be expedited and greater efforts should be made in the supply of key technologies for the effective enforcement of emission trading mechanism to provide technical supports to the experimental and demonstrative projects and technical assurance for the enforcement of the policy. Areas in the key technology system that require break-through efforts include procedures and methods to assure the equality and fairness in the initial allocation of paid emission allowances, pricing mechanism for initial emission rights, emission trading platform, methods for eliminating trading asymmetry, trading ratio between different sectors and regions, schemes for increasing the cost of illegal acts at the pollution sources, solutions to taxation problems that might get in the way of emission trading, trading techniques for point sources and nonpoint sources, schemes for organic connection of emission trading and total emission control, emission charges, emission permits and environmental impact assessment and other relevant systems and policies. A

reasonably constructed and continuously improved technical support system will be supportive to the implementation of the experimental projects at the national level and the experimental explorations at the local level so as to take the shortcut to and reduce the cost of emission trading.

A fair and reasonable system shall be established to assure effective allocation of the initial emission allowances. Fair allocation on the primary market where the government dominates the initial allocation of emission rights serves as an important basis and prerequisite for effective operation of the emission trading mechanism. Relevant policies should be enforced to regulate the property rights of the emission permits on the primary market, define the rights and responsibilities of the MEP and the local environmental protection bureaus as the responsible governmental department in determining the target quantities and allowances for initial allocation, reasonably design the conditions, procedures and time limits for paid acquisition of emission permits, initial pricing mechanism, equivalent coefficient or correction coefficient for different regions and sectors, exploitation and management of the funds from the initial emission allowances and so on. What is worth noting in particular is that the emission performance methodology should be adopted to allocate emission allowances to enterprises; the initial allocation price should be adjusted based on the supply-and-demand relationship on market and changes of the unit cost of pollution treatment; new and existing enterprises, as the objects of allocation should be treated in a differential way while bankrupt enterprises should have the emission permits returned; in terms of the design of the effective period of such allocation, it is recommended that five-year emission permits be designed in association with the five-year total emission control planning to enable the subject of the emission trading market to have definite expectation on the price of emission allowances; payments for emission trading may be conducted in both a single payment or installments; so far as fund management is concerned, earnings from the public sale of emission allowances should be incorporated into a special emission charge fund for centralized management and utilized to support the development of renewable energy and promote energy efficiency etc. With a reasonable allowance allocation system, the allocation activities shall be carried out by the governmental departments in an equal, fair and open manner, corruption and frauds arising from allocation of emission permits shall be prevented and a primary market for emission trading shall be constructed and improved continuously.

The emission trading market system shall be activated and the configuration

efficiency of the environmental capacity resources shall be promoted through emission trading. Determination and allocation of total emission is only the first step and reallocation of the emission right (namely property rights of emission permit) among the emission entities shall be conducted on the emission trading market. The market system will not be activated and the role that the market plays in configuration of environmental capacity resources will not be brought into full play until emission trading is realized. In order to build a well-operating secondary market for emission trading, the following tasks should be carried out to a satisfactory level: the major objects and scope of the functions of the secondary market policies shall be defined; new enterprises shall be allowed to obtain emission allowances from the secondary market or from the preserved allowances of the government on a paid basis; in terms of the design of trading prices, a pricing mechanism that involves self-adjustment by the market under the guidance of the government shall be established; trading rules shall be formulated to prevent monopoly of trading prices; A trading information platform shall be set up to keep track of and supervise and manage the trading of emission allowances; trading of different space dimensions shall be regulated according to different standards and cross-region trading, in particular, shall be regulated to avoid “hot spot” pollution as a result of large quantity of pollution emissions; transfer of emission permits shall be incorporated into the EIA approval and management procedure after an application is submitted to the local environmental protection authority; misuse and illegal transfer of emission permits shall be effectively curbed by means of legislation or other actions; deliberate forestall and other trading actions that might disturb the market shall be eliminated; trading liabilities shall be defined and enterprises discharging noncompliant pollutants shall be heavily punished; Active financial and taxation policies shall be established and the subjects of market shall be encouraged to contribute to the configuration of environmental capacity resources driven by the pursuit of maximum self-interest. With these actions in place, normal trading of emission permits on the secondary market shall be assured and the emission trading market shall be activated in the true sense.

A system of laws and regulations on emission trading shall be built and the capability of law supply shall be strengthened to facilitate policy enforcement. Paid acquisition and trading of emission rights is an important attempt in the reform of environmental policies. Closer attention shall be paid to the legal competence building for the emission trading mechanism in order to assure powerful law supply and facilitate the enforcement of the policies and standardization of the entire process of emission trading.

The legal status of the paid acquisition and trading of emission permits shall be stipulated upon the revision of specific laws such as the “Environmental Protection Law”, the “Law on Prevention and Control of Water Pollution” and the “Law on Prevention and Control of Atmospheric Pollution”. Included in the “Law on Prevention and Control of Atmospheric Pollution” and the newly revised “Law on Prevention and Control of Water Pollution) (2008 edition) are only some general provisions on emission permits and no legal supports are available for emission trading. In addition, laws and regulations should be enacted as soon as possible regarding the methods for implementation and management of total emission control and paid acquisition of emission permits, methods of regulating emission trading and methods for management of fund for paid use of emission permits. Responsibilities, rights and interests and liabilities for breach of law of the allocating subjects such as the government departments, enterprises and intermediaries as well as the trading entities in total emission control, initial allocation of emission permits and paid use of emission allowances and emission trading shall be further defined to provide rigid legal guarantee to the regulation of the primary and secondary market of emission trading and promotion of the operational stability of the emission trading market and to make sure that emission trading is conducted by law.

The pollution source monitoring and management system should be improved to reinforce the capability building of emission trading in the experimental areas and sectors. For the sake of full implementation of emission trading, stronger efforts are needed to strengthen the pollutant emission monitoring and supervising and management capabilities and extend the scope of emission entities that are required to install online monitoring devices so as to assure effective tracking and monitoring of the emission of various pollutants. In view of the fact that the emission trading mechanism is a complicated system involving multiple subjects, multiple sectors, multiple institutions and issues of multiple aspects, a well-integrated information exchange and coordination platform is essential to the actual promotion of the effectiveness of policy enforcement. More efforts should be extended to the construction of the pollution source database and information platform, the management platform for paid allocation of emission allowances, the monitoring and verification platform for pollution source emission level and the management platform for pollution source emission trading accounts, an emission account system shall be established for the enterprises to achieve comprehensive management of pollution sources participating in the system of paid allocation and emission trading, and

make sure emission of pollutants of all types is under effective control.

A sound supervision system for enforcement of environmental laws shall be established to provide legal regulation for implementation of emission trading. Powerful supervision of environmental law enforcement is a baseline institutional assurance to the operation of the emission trading mechanism and also a basic approach to transition of the emission trading laws and policies from “what they ought to be” to “what they are”. Without effective supervision of law enforcement, the executing force of emission trading will be greatly compromised, the laws and regulations will be nothing but a pile of waste paper and the functions of the laws in regulating trading activities will not be realized. Procedures for review and approval of emission trading should be strictly followed and more powerful supervision and inspection and administrative punishment and sanctions should be carried out to increase the cost of the illegal acts by the emission entities breaking the total emission limit.

4.3 The action roadmap for the advancement of emission trading

China is in face of numerous difficulties in terms of policy, management system and technology during the implementation of the mechanism of paid use and trading of emission rights. The MEP, the MF and the National Development & Reform Committee (NDRC) and other concerned departments should make the best of the completed experiments and the experiences from foreign countries and take hold of the precious opportunity arising from the ongoing reform and transition of Chinese economy to make significant break-through in the near future in the experiments of emission trading in relatively well-prepared sectors and regions. A reasonable implementation plan should be developed so that the policies are enforced proactively and steadily in the order of difficulty with break-through at key nodes while the experiments are conducted in an orderly manner from individual points till complete coverage. All possible efforts shall be made to construct an emission trading policy system conforming to the specific situation in China by 2020.

For the near future (2008 --- 2010) , the main tasks shall focus on studies in paid use and trading of emission rights and construction of regulation platform and organization structure as well as propaganda and education in this regard; active supports shall be provided to the third party profit-making organizations mainly engaged in emission trading. Experiments on emission trading of SO_2 and other major air pollutants shall be conducted in the electricity sector nationwide and further extended to iron and steel and other sectors with

excellent monitoring conditions and high contribution to SO_2 emission; while greater efforts are made in the experimental and demonstrative projects of COD emission trading in the Tai Lake basin, simultaneous COD emission trading experiments are encouraged in other basins and regions meeting the required conditions. Besides, actions shall be taken to push the experiments on emission trading of nitrogen, phosphate and NOx in some areas; development of CDM project operation platform shall be reinforced and active supports shall be provided to CDM projects in development of renewable energy, energy efficiency and recovery and reuse of methane and other fields of priority.

For the medium term (2010 --- 2015), the main efforts shall focus on the promulgation of relevant policies and extension and deepening of the scope of emission trading policies to further expand the sector and territorial space of emission trading. At the national level, electricity sector and non-electricity sectors with significant contribution to SO_2 emission shall be incorporated into the policy framework of SO_2 emission trading and experimental explorations shall be conducted actively. Efforts shall be made to achieve nationwide implementation of COD emission trading during this stage in key basins provided that the policies are ready; in the meanwhile, the scope of trading objects shall be expanded and experiments on emission trading of nitrogen, phosphate and NOx and Hg pollutants shall be actively implemented; experiments of voluntary emission trading of greenhouse gases and other products with environmental rights and interests shall be encouraged; development of CDM project in energy efficiency and other fields of priority shall be encouraged on a continuous basis to promote the level of low carbon technology in China.

Speaking of the key tasks for the long term (2015 --- 2020), a national market mechanism for emission trading of SO_2 and COD shall be constructed; supporting policies shall be staged to facilitate experiments on emission trading of nitrogen, phosphate, NOx and Hg pollutants; arrangements for experiments on emission trading of greenhouse gases shall be made actively and powerful supports shall be provided to electricity, cement, thermal power and steel sectors so as to extend the objects of emission trading to greenhouse gases and provide technical reserves for fulfilling the requirements of Kyoto Protocol Phase III. In addition, active efforts shall be made to strengthen and improve the policy innovation of emission trading market and put in place a policy system for paid use and pollution emission rights fitting the specific situation of China.

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