

# ESTABLISHING CHINA'S GREEN FINANCIAL SYSTEM

## Detailed Recommendations 7: Promote Development of Emissions Trading Markets



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## Detailed Recommendation 7:

### Promote Development of Emissions Trading Markets

As shown by international experience, carbon trading and pollution rights trading markets are important financial infrastructures for reducing the cost and increasing the efficiency of emission abatement. Carbon trading and pollution rights trading are all market-based instruments of emission abatement with different objectives, regulatory authorities and approaches. The seven major carbon trading pilot programs have been successively initiated since 2013 and the development of a national carbon market has also been put on the agenda with trial operation on a national scale scheduled in 2016. In the current stage of top-level design, the priority for promoting the healthy development of national carbon market is to review the experiences of regional carbon trading pilot programs and strike a balance between fairness and efficiency, liquidity and stability, and political acceptability and practical operability in light of the characteristics of a national market different from existing regional markets. Meanwhile, the establishment of a pollution rights pricing and trading system should also become a major institutional innovation in the area of China's environmental protection.

#### (I) Experiences and lessons of pilot carbon markets

On October 29, 2011, the National Development and Reform Commission promulgated the *Notice on Launching Carbon Emissions Rights Trading Pilot*, which approved carbon trading pilot programs to be carried out in Beijing, Tianjin, Shanghai, Chongqing, Hubei, Guangdong and Shenzhen. Launch of carbon trading in Shenzhen on June 18, 2013 marks the first step for implementing carbon trading in China. Without doubt, China's carbon trading pilot programs have achieved the objective of market-based emission abatement to some extent and various localities have made different attempts and explorations in such areas as policies and regulations, technical standards and market operation. They have also established solid technological foundations and capabilities and initially realized the pricing function of carbon market. However, we should also draw attention to the problems arising from the course of pilot programs.

Meanwhile, the development of a national carbon market has been swiftly put on the agenda with trial operation on a national scale scheduled in 2016. The NDRC promulgated *Interim Measures for the Administration of Carbon Emissions Rights Trading* on December 10, 2014, which provides a basic institutional framework for the development of a national carbon trading market to be followed by relevant rules afterwards. In the current stage of top-level design, an essential task of promoting the healthy development of China's carbon market is to draw upon the lessons and experiences of regional carbon pilot programs and strive to strike a balance between fairness and efficiency, liquidity and stability, and political acceptability and practical operability in light of

the characteristics of national market that are different from regional markets. The following questions arising from the course of pilot carbon trading markets have been observed:

**1. An initial carbon trading system has been created but various mechanisms have yet to improve**

Various pilot regions have designed whole sets of carbon trading systems, including a series of core mechanisms such as coverage scope, capping and quota allocation, an accounting system, a registration and record filing system, a trading system, information disclosure and market supervision. Five pilot regions have already successfully completed the first-year contract performance. Nevertheless, carbon trading system is a highly complex policy system and it took years of planning and experiment from the deliberation and official operation of foreign carbon markets. However, from the preliminary preparations by the end of 2011 to the official launch in 2013, China's pilot carbon trading programs are not sufficiently prepared and, with the exception of a few pilot programs, most pilot programs were launched in a hasty manner with the following problems:

- **Lack of policy continuity:** As a result of insufficient preparations and inadequate policy design and capacity building, some pilot programs had to frequently revise relevant policies and adjust trading systems after the first year of contract performance.
- **Weak legally binding force:** A carbon trading system cannot be properly implemented without the safeguard of compulsory legally binding force. Among various pilot regions, only Shenzhen, Beijing and Chongqing have adopted local legislation with relatively strong binding force on emitters. Most other pilot regions have followed government regulations and a few pilot regions such as Tianjin have only adopted departmental documents as basis of carbon trading systems. The level of penalty is the lightest for Tianjin, which only requires rectification before deadline and cancellation of policy preferences for three years. Although other pilot regions have employed fines of different magnitudes, the overall level of penalty remains limited.
- **Poor foundations for statistical accounting for carbon emissions:** Prior to pilot programs of carbon trading, China did not have a statistical system in place for greenhouse gas emissions at the corporate level and various pilot programs all faced the dilemma of incomplete history data. Most pilot programs acquired certain data on the basis of history emission data but these retroactive data are relatively poor in quality. In addition, the competency of data verification institutions is uneven with inconsistent verification standards. Naturally, certain deviations will exist in those policies instituted on the basis of these data. For instance, the capping of carbon emissions is set too high and the benchmark values of carbon emissions are designed improperly.
- **Lack of transparent carbon market information:** Various pilot carbon trading programs all have the problem of information transparency for the inclusion of corporate emission data, confirmation of quota volume, quota allocation scheme and trading data. The reason for such transparency problems is that local governments and exchanges are

unwilling to disclose relevant data to the public, resulting in a highly policy driven market, greatly increased trading cost and inefficiency.

- **Incomplete market regulation:** Currently, regulatory authorities have attached inadequate attention to regulation while focusing on regulatory design and the issuance of various policies to address problems that emerged at every turn. However, a complete market regulation system is not in place for both market players and trading activities. Efforts must be made to enhance certification, management and supervision of market players and strengthen the identification, prevention and penalty of insider trading and market manipulation.

## 2. Challenges confronting quota allocation

Quota allocation is a major difficulty of carbon trading system and represents the emission rights of emitters in contract performance years as the main objects of transaction. Allocation of emission quotas decides the emission abatement and contract performance costs for emitters. Among the seven pilot programs, with the exception of independent declarations adopted by Chongqing, six pilot programs have adopted three mainstream quota allocation methods, i.e. history method, benchmark method and auction method with respective positive attempts and innovations. The following experiences and problems can be identified:

- **History method has the problem of equality:** In addition to the pilot programs of Chongqing and Shenzhen, the other five pilot programs have adopted free allocation methods based on the history of emission intensity or historic emissions. This method is easy to operate but has brought about significant equality issues. For instance, the structural changes of industry climate cycles give rise to an equal quota allocation; earlier emission abatement actions are not taken into consideration; emergencies such as maintenance shutdown and incidents are not well represented in quota allocation. Various pilot programs have attempted to address these problems through ex-ante quota allocation and ex-post quota adjustment but with poor results. In some cases, the problem of ‘quota rent-seeking’ has emerged and some cap-limited companies have attempted to increase quota allocations through various public relations efforts, giving rise to new inequalities.
- **Benchmark method is subject to the impact of subjective factors:** Shenzhen is the only pilot program that has adopted a benchmark method and employed a benchmark method of quota allocation for electric power, water supply and fuel gas sectors. Value-based carbon intensity indicators (carbon emissions per unit of industrial value-added) have been put into place based on the explorations of manufacturing and other industrial sectors. Other pilot programs are still confined to electric power and heating supply sectors and a few other sectors in their attempts of establishing the benchmark method. The advantage of the benchmark method is the representation of intra-industry equality that encourages companies to take energy conservation and emission abatement actions. The downside is difficulties of implementation and impacts of subjective factors.

Currently, the benchmark method of electric power sector has been adopted the most extensively among the pilot programs but inconsistent benchmarks also exist for different regions and incentives have a limited effect.<sup>1</sup>

- **Auction mechanism is not flexible:** Auctioning is considered, as an allocation method, the most favourable to price discovery. However, auctioning will also increase the performance cost of companies and therefore, its acceptability is limited in the initial stage of market development. This drawback has been fully reflected in the pilot program of Guangdong province, where the ‘entrance ticket system’ (3 percent of paid quota should be auctioned in order to receive ‘entrance tickets’ before the 97 percent of free quota are distributed) has increased the threshold for companies to participate in the carbon market and the one-off payment of 3 percent quota greatly affected the cash flow of companies and encountered strong resistance. Currently, Guangdong has already optimized its auctioning system, cancelled the ‘entrance ticket system’, substantially reduced the bottom prices of auctioning, and permitted non-cap-limited companies to participate in the auctioning. Hubei province, Shanghai municipality and Shenzhen city have carried out an auction respectively. Among them, Hubei auctioned 30 percent of quotas reserved by the government through open bidding and permitted non-cap-limited companies to access primary markets.

### **3. The market size and price range have developed but the liquidity shortage is severe and carbon price signals are inaccurate**

After one year of operation, the secondary markets of various pilot regions have assumed an initial scale and the band of overall market price fluctuations has been limited between 20 yuan/ton and 90 yuan/ton, which sets a good example for the band of future national carbon market price fluctuations. However, the problem of serious liquidity shortage has also affected the accuracy of carbon pricing.

**First, a severe shortage of liquidity.** Between the launch and August 22, 2014, the trading volume of various pilot regions is less than 13 million tons per day with total trading value less than 500 million yuan (US\$80 million), which is smaller than the peak single-day trading volume of Europe in carbon market. Market liquidity is jointly determined by such factors as institutional design, risk preferences of products and participants, as well as other institutional constraints. Currently, regional quotas are local privileges and the size of quota volume and tightness of quota allocation directly affect a region’s trading vibrancy. Trading products in the market are limited and confined to the spot trading of quotas. For various reasons, by August 22, 2014, China’s Certified Emission Reduction Program (CCER) was yet to be launched in the market. Various pilot regions cancelled offset ratios and the trading volume of the CCER is expected to be very limited. Most of market

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<sup>1</sup> Li Xueyu: Dilemma of Quota Allocation Remains As China Prepares to Build a National Carbon Market, 21st Century Business Herald, September 24, 2014.

players are cap-limited companies, which are engaged in real industries with limited awareness of carbon assets and low acceptability of carbon trading. Unspecified procedures of accounting and ledgers, invoice issuance and tax types have presented cap-limited companies with complicated internal communication and approval procedures, which have dampened their enthusiasm to take part in trading activities. Although most pilot regions have been opened to investment institutions, investment institutions have maintained a wait-and-see attitude due to the uncertainties of the carbon market and meagre liquidity. In addition to individual investors, Shenzhen has recently introduced overseas investment institutions but Shenzhen has the smallest market size compared to other pilot regions, which makes it difficult to substantially increase trading volume. Subject to the “37/38 Document” of the CSRC, carbon trading platforms have adopted the trading model of “T+3/5” that restricts the vibrancy of market trading.

**Second, the carbon price signal is inaccurate.** An important function of the carbon market is to release carbon price signals that reflect the cost of carbon emissions abatement. However, prices vary greatly across different pilot regions. By August 22, 2014, the highest market price reached 130.9 yuan/ton (Shenzhen) and the lowest price was 20.74 yuan/ton (Tianjin) while the highest average strike price was 70.2 yuan/ton (Shenzhen) and the minimum strike price was 29.6 yuan/ton (Tianjin). Price fluctuations are the greatest in Shenzhen within the range between +80 percent and -62 percent and relatively small in Shanghai’s and Beijing’s markets. Most pilot provinces and municipalities have defined performance periods to be June or July of each year and in 2014, the last month before contract performance accounted for more than 65 percent of total trading volume for all pilot regions, which indicates that most transactions take place in the last month with the main purpose of contract performance, an excessive trading concentration and inadequate market effectiveness. As a result, it is difficult to develop fair prices.

#### **4. Enterprises are becoming aware of the urgency for emission abatement but the awareness of carbon asset management remains poor**

Most cap-limited companies have initially developed an awareness of emission abatement through the institution of trading rules for various regional carbon trading pilot programs, promotion and capacity building and more than one year of trading. However, given the novelty of carbon trading, rapid progress of pilot programs and insufficient consultations with stakeholders, some companies have yet to fully understand the significance and objectives of this policy and inevitably tend to resist its implementation, as reflected in their lethargic participation in carbon trading and uncooperativeness with the verification of carbon emission reports. Awareness of carbon asset management is generally rather weak.

Effective carbon asset management will not only achieve assets compliance, but also help abatement companies to lock up prices and minimize price risks in the process of emission abatement while maximizing the revenues from carbon assets. However, most companies have yet to establish an effective carbon assets management system and only a few companies have specifically established carbon assets management companies to enforce consistent management

of carbon assets of cap-limited companies affiliated to the corporate conglomerates. Currently, companies have adopted different management methods for carbon assets and established various management departments including financial department, office of energy conservation and emission abatement management, as well as administrative office and comprehensive affairs office. Due to the lack of professional talents, most companies have appointed department managers or deputy general managers as responsible persons consisting of engineers or energy and environmental management personnel, who lack the knowledge, experience and confidence for taking part in market transactions.

## **(II) Policy recommendations on developing a national carbon market**

According to the NDRC planning, relevant administrative measures on the national carbon market will be promulgated by the end of 2014 in the following stages: stage of preparation between 2014 and 2015 characterized by the improvement of relevant laws and regulations, technical standards and infrastructure development; stage of operation and improvement (Stage I) between 2016 and 2020, when carbon market will be launched and improved on a comprehensive basis; stage of further development after 2020 (Stage II), when the scope of participating companies and trading products will be expanded and attempts of integration with international markets will be made. After careful research and analysis, we would like to propose the following policy recommendations regarding the development of a national carbon market:

### **1. Implement both ‘top-down’ and ‘bottom-up’ development approaches**

Although the objective of carbon trading pilot programs is to provide experiences for developing a national carbon market, regional carbon trading pilot programs will not be terminated indiscriminately with the establishment of a national carbon market. Efforts must be made to effectively integrate existing pilot markets with the national carbon trading market and allow flexibility on the part of local governments. The national carbon market should be a multi-tiered market system that includes both a national secondary trading market and a regional primary market, as well as carbon finance market. Local governments should play a major role in the development of the latter.

Therefore, two pathways exist for the creation of a national carbon market: **first, a top-down carbon market**, namely, the NDRC creates national systems of emission abatement objectives, contract performance, MRV, market operation and supervision and establishes consistent market rules to carry out market transactions under the new framework. **Second, a bottom-up carbon market**, i.e. regional capital markets will be granted with greater autonomy in such areas as interconnections with other non-pilot regions and national carbon market, independent quota allocation, together with flexible use of funds raised from auctions. Attention should be paid to the following two important questions in creating the carbon market:

**First, a reasonable allocation of authority between central and local governments.** Quota allocation is the key issue of carbon market and concerns the balance between fairness and

efficiency. Given the great complexity of quota allocation, various regions have already adopted different allocation methods with certain experiences. The key to quota allocation for national carbon market lies in the unification of allocation rules while local governments should be endowed with the rights and flexibility of quota allocation.

**Second, a successful transition of pilot carbon exchanges.** China's existing seven pilot carbon exchanges have developed highly complex operational models and equity structures yet the national carbon market needs to be supported by no more than two exchanges. This indicates that at least five exchanges need to be converted and the following two directions of conversion have been identified: first, develop into local auctioning platforms; second, transform into carbon finance service institutions. Efforts must be made to properly address the issues of the conversion costs of carbon exchanges and the identification of standards for national carbon trading.

## **2. Improve relevant institutional design and effectiveness evaluation**

**First, establish a steering work group of top-level design.** Future carbon market cannot function well without an appropriate design for carbon market mechanisms, which requires decision-makers to not only have an in-depth knowledge about carbon market but also be familiar with economic, financial and market operations. China should put together a work group of top-level design for national carbon market consisting of representatives from relevant government departments (the NDRC, local development and reform commissions of pilot regions, the CSRC and the Ministry of Finance), academia, exchange institutions (including cap-limited companies and investors), third-party institutions and various pilot markets, with a view to developing a joint working mechanism, create a regular evaluation mechanism based on the experiences of existing regional carbon markets, properly evaluate policy effectiveness, and constantly improve the top level design.

**Second, enhance legal binding force.** Under the constraint of *Interim Measures for the Administration of Carbon Emissions Rights Trading*, efforts should be made to identify carbon emission rights, increase the legal binding force of the Interim Measures and increase the cost of violations. In addition, strict information disclosure mechanism should be put into place to increase market transparency, long-term policy stability and market predictability, including policy design, quota quantity, and emission data and trading data.

**Third, coordinate with other policy instruments.** First, coordinate with a carbon tax. Carbon trading and a carbon tax are two carbon pricing instruments with respective advantages and disadvantages and can be designed in conjunction with one another. For sectors not covered by carbon trading, a carbon tax can be employed as a regulatory instrument. Second, coordinate with policies on energy conservation, emissions abatement and new energy. Contradictions among various policies should be avoided and attention should be given to the synergy effect of various policies in the design of mechanisms to develop policy portfolios for low-carbon transition.



**Fourth, enhance the capacity building of carbon trading.** Policy design for carbon trading is highly complex and involves various stakeholders. In this sense, the establishment of a healthy and well-functioning carbon market requires capacity building of various stakeholders including carbon trading policymakers, implementing agencies and relevant administrators at the top and cap-limited companies and other trading parties at the bottom.

### **3. Improve the quality of emission data**

Emission data are the foundation of a carbon market and a key factor for both the survival and development of companies and the accomplishment of national energy conservation and emission abatement objectives.

**First, accuracy of emissions data.** From a technical perspective, MRV standards must be sound and MRV measurement results must be accurate. On the one hand, the MRV standards must be consistent and a national basis for the same industry; on the other hand, MRV standards must be gradually recognized by the international community and integrated with international practices.

**Second, reliability of emissions data.** From a moral perspective, efforts must be made to eliminate favouritism and frauds. Specifically, efforts must be made to severely crack down upon the underreporting or misstatements by cap-limited companies, cover-up by third-party institutions and rent seeking by competent authorities.

**Third, transparency of emissions data.** Emissions data are the foundation of carbon market trading and the disclosure of corporate emissions data facilitates public supervision and promotes market openness, fairness and justice. Independent third-party emissions data accounting and registration institutions should be established when appropriate.

### **4. Create fully flexible quota capping**

China remains in the middle stage of industrialization and, in accordance with ‘common but differentiated responsibilities’ under the United Nations Framework Convention on Climate Change, China does not have to commit itself to absolute emission abatement quantities within a short period of time. However, without a narrowing cap, the scarcity of emission rights cannot be created and thus domestic carbon market cannot be developed. In addition, China already declared that by 2020, its CO<sub>2</sub> emissions per unit of GDP will reduce by 40 to 45 percent compared with the level of 2005 and announced a plan to reach the peak of CO<sub>2</sub> emissions by 2030 and strive to achieve this objective on an early date. With reference to European experiences, attention should be given to the following aspects in determining the quota cap:

**First, determine national and the local quota caps.** In accordance with the emission abatement objectives for the 12th Five-Year Plan period (2011-2015) and the future 13th Five-Year Plan period (2016-2020) and with overall considerations of national and regional greenhouse gas emissions, economic growth, industry structure, energy mix, inclusion of major emitters and development planning, a national carbon emission quota allocation model should be put into place and the NDRC should determine national and local emission quota caps.

**Second, quota caps can be moderately tight.** Tight emission caps can alleviate the problem of quota oversupply caused by inaccurate emission data, subjective misstatements of companies and local protectionism and thus create market scarcity. Only by maintaining certain scarcity will the market prices of quota be kept above a certain level and sufficient positive incentives be provided to companies that strive to cut emissions. In addition, the government should retain reserve quotas to be sold when market quota supply becomes scarce and purchase excess quotas for cancellation during oversupply in order to prevent wild price fluctuations.

**Third, prevent extreme situations.** Under the scenario of business as usual (BAU), market caps (or growth) should be reduced in a step-by-step manner to create scarcity to ensure reasonable pricing and promote trading. Meanwhile, efforts must be made to prevent extreme prices during economic overheating or recession. Considerations should also be given to establishing a stabilization fund and auction rules to prevent wild swings of demand and prices.

**Fourth, an offset mechanism should be used prudently.** An offset proportion and emission abatement accounting period should be controlled in a reasonable manner in relation to market caps, emission abatement objectives and market expectations. In conjunction with industry restructuring and regional ecological compensation, efforts should be made to relax restrictions on the types of offset items and project sources.

#### **5. Adopt flexible methods for the allocation of quota portfolios**

Rationality of quota allocation will greatly affect the carbon pricing and liquidity of secondary markets in the future. Different portfolios of allocation methods should be adopted for different industrial sectors according to different stages of market development.

**First, flexible use of free allocation.** The history method and the benchmark method of free allocation should be used in combination for different stages and industries. The history method is the most popular during the initial period of trading system but should be optimized to address regional and industry differences in a flexible manner and determine the level of application for history emission data and incentives for early-stage emission abatement activities in a scientific and a reasonable manner and address the sharing of contract performance costs for additional output capacity. In addition to industry characteristics and data, the transmutability of intra-industry abatement incentives should be given consideration, as well as in the employment of benchmark method.

**Second, auctioning should be carried out in a step-by-step manner.** Auctioning is the optimal choice for promoting the long-term and healthy development of emissions abatement market. Auctioning of certain quotas can be adopted and the scope of auctioning can be expanded gradually, so that all quotas have to be ultimately acquired on a paid basis. This approach represents a future pathway for the promotion of carbon emission abatement, but must be carried out in a step-by-step manner in the early stages of development. From an industry dimension, the auction method should be followed on an early date for industries confronted with

relatively limited external competition and convenient cost transmission, and free allocation can be implemented in the early stages of development for other industries depending on the level of competition.

#### **6. Promote secondary market liquidity through various means**

The fundamental objective of a carbon market is to promote emission abatement rather than the transaction itself. However, fair prices cannot be discovered and abatement costs cannot be minimized without vibrant transactions and sufficient liquidity.

**First, enrich trading products.** Block transactions (trade by agreement) should be vigorously developed. Most large and medium-sized cap-limited companies have a certain demand for trade by agreement and expect to transfer block transaction quotas through more effective means and achieve contract performance objectives at low costs. It is suggested that attention be paid to developing the market of trade by agreement, relaxing policy restrictions, promoting substitutive competition between different trading markets, and thus increasing contract performance flexibility for companies. Meanwhile, efforts must be made to strengthen the research on futures and options of carbon emission rights and to launch relevant products on an early date. Prior to the readiness of conditions for establishing a futures market, feasible non-standardized derivatives such as forward contracts and carbon swaps can be explored and carbon insurance products can be embedded into derivatives contracts to increase product attractiveness. When the spot market develops to a certain level, great efforts must be made to develop futures and options markets and give full play to the role of derivatives market in hedging and price discovery.

**Second, facilitate trading methods.** Carbon trading markets should provide complete and convenient trading facilities with simple and understandable operational rules. It is suggested that the CSRC cancel the restrictions of No. 37/38 Document on carbon trading platforms and promote carbon trading platforms to adopt centralized trading methods and continuous listing for trading.

**Third, foster market makers.** Cap-limited companies are the trading entities of the carbon market but their awareness and competency of trading are limited. Trading platforms should give priority to fostering market makers and encourage them to provide trading services for cap-limited companies. Individual investors should be permitted on a gradual basis. In order to control risks, eligibility criteria for individual investors should be raised or broker members should be assigned to provide trading agency services for individual investors.

#### **7. Vigorously develop carbon finance**

The promotion of corporate emission abatement will require financing for the carbon market in such areas as financial intermediation, cost reduction and price discovery. Furthermore, efforts should be made to promote standardization, including carbon accounting standards and carbon information disclosure.

**First, facilitate innovation for carbon finance institutions.** Various localities should be encouraged to raise funds through auctioning, fiscal subsidies and social pooling, and create local carbon fund

systems. It is suggested that China's Clean Development Mechanism Fund (CDMF) establish regional capital funds jointly with various pilot regions to develop mechanisms of public fund cooperation and create a pattern of coexisting national climate change funds and multiple regional carbon funds. The CDMF may fully leverage its guiding role, release stable policy signals, ensure the successful completion of national low-carbon economy and climate change objectives, and catalyze and expedite the development of green and low carbon economy. Meanwhile, local carbon funds may create PPP platforms with local characteristics in relation to regional characteristics and priority development directions to ensure that public funds are able to generate additional policy effects, reduce crowding out effect (i.e. reduce investments of the private sector in the same area), and prevent repetitive investments.

**Second, develop diversified carbon finance products,** including mortgage-backed loans of carbon assets, carbon bonds, securitization of carbon assets, carbon trust and carbon insurance.

**Third, provide appropriate policy support.** Fund-raising costs should be reduced for fund users by offering policy preferences such as interest rate discounts and tax exemptions or the investment return should be increased for fund suppliers to support their development. For instance, companies that have received loans under carbon emission projects should be supported by full or partial interest rate discounts offered by special government funds; loans requested by cap-limited companies for energy renovation projects should be entitled to appropriate interest rate discounts offered by local governments.

### **(III) Policy recommendations on promoting the paid use of emission rights and trading mechanism**

Establishing a system for the paid use and trading of emission rights (hereinafter referred to as pollution rights trading) is a major and fundamental institutional innovation and reform in the area of environment and natural resources for China and an important element in the institutional development of ecological civilization. Since 2007, China has already carried out pilot programs of emission trading for SO<sub>2</sub> and water contaminants in 11 provinces (autonomous regions and municipalities). On August 25, 2014, the State Council promulgated *Guiding Opinions of the State Council General Office on Further Promoting the Pilot Programs of the Paid Use and Trading of Emission Rights* to expedite the application of this system in environmental management and for the first time identified a timetable to creating a system of pollution rights trading.

The fundamental principles of emissions trading derive from the emissions trading system. Nevertheless, certain differences exist between pollution rights trading and greenhouse gas emissions trading mainly due to different physical attributes of greenhouse gases and regional pollutants. First, greenhouse gases are global pollutants and both trading parties can be free from geographical restrictions while in the pollution rights trading with the objective of air quality or water quality management, both trading parties are generally located within the same region of air pollution or the same water basin. Second, the lifecycle of greenhouse gases can be as long as hundreds of years while the lifecycle of air pollutants is generally just a few hours to a few days.

## **1. Significance of establishing a mechanism of paid use and trading of pollution rights**

If the value of natural and ecological resources cannot be fully reflected in the market, the costs of resource utilization and environmental pollution will be excessively low and pollution and environmental degradation will intensify in the process of economic development. Under the ‘cap control’ of paid use of pollution rights and emission trading, the government sells pollution rights to polluters and permit the trading of pollution rights in the secondary market. Establishment of a system for the paid use and trading of pollution rights can not only systematically increase the value of ecological resources in commercial activities but also steer private investments to participate in environmental governance by increasing the liquidity of pollution rights through market-based mechanisms. Furthermore, artificially endowed commodity attributes of pollution rights enables the price discovery of pollution rights through market mechanisms on a dynamic basis with changes in demand and supply relations and the internalization of external costs in more flexible ways compared with taxes and fees.

Under the pollution rights trading system, emission quotas will become resources with definite transaction values. By over-fulfilling emission abatement objectives, companies are able to trade excess emission quotas to make a profit. In this manner, companies are motivated to improve technology for pollution abatement and clean production and thus profit from better environmental performance and develop greater corporate competitiveness.

The US already has sophisticated experiences of environmental pollution abatement through the trading system of pollution rights as an effective policy of the environmental economy. Significant economic, social and environmental benefits have been gained, from the early stages of emission rights trading for pollution and water management to the later stages of the acid rain prevention program. As shown by the US experience, another advantage of an emission trading mechanism is the transcendence of administrative jurisdictions of environmental management and the development of pollution treatment models for specific industries, regions and water basins.

## **2. Policy recommendations**

**First, identify the optimal scope for the implementation of systems for the paid use and the trading of pollution rights.** Although emission trading can bring about significant environmental benefits, not all pollution control methods are suitable for the paid use and trading of emission rights. The government should implement the systems for the paid use and trading of pollution rights for pollutants, industries, water basins or regions suitable for pollution rights trading. Emission sources not suitable for pollution rights trading should be controlled through other administrative or economic means. Attention should be given to the coordination with existing environmental management systems; identify government departments responsible for implementing all pollution rights trading systems, require assistance and support of other government departments in transaction activities, and develop plans for the coordination of daily environmental management activities, including pollution rights trading and environmental impact assessment review and approval, environmental acceptance upon project completion,

management of pollution permits, pollution pricing, environmental monitoring, environmental supervision, pollution treatment and prevention, and emission abatement through cap control.

For all pollution rights trading systems, emission abatement quantities as the nucleus of the trading system must satisfy the following four statutory conditions:

First, authenticity: Specific and identifiable measures must be implemented to reduce actual emissions.

Second, enforceability: Abatement measures must be brought under effective government monitoring with assurance that these measures have permanently changed emission sources.

Third, measurability: Calculation methods for emissions abatement quantities must be accurate, objective, open, transparent and widely applicable and the original data for verifying emissions abatement quantities or surplus quotas must be sufficient and accurate.

Fourth, permanence: Emission abatements must be permanent, i.e. entities of emissions abatement must shut down emission sources or renounce all or partial emission rights.

In addition, objects contained in the pollution rights trading system must satisfy the following two conditions: first, hazards of pollutants being traded must be regional pollution instead of local pollution in order to avoid the migration of pollution. Second, various technological means and costs exist for the abatement of pollutants, so that companies will be able to make a choice between the abatement of their own pollution emissions and purchase of emission quotas to develop motivations of trading.

**Second, ensure accurate baseline calculations, impose strict emission caps and avoid repetitive calculations of emission abatement quantities.** On the one hand, prior to the occurrence of pollution rights trading, the government should conduct accurate calculations of the history emission baseline of cap-limited emission sources to avoid the overstatements of abatement results due to high baseline emissions. On the other hand, in establishing the baseline scenario of emission abatement, existing emission abatement demand must be excluded from the baseline scenario to ensure the authenticity and effectiveness of emission abatement quotas for trading.

According to such data as the history emission baseline, environmental capacity and regional industrial and energy development objectives, an emission quota mechanism and regular evaluation and modification mechanisms should be put into place for the continuous abatement of emissions through the gradual reduction of emission quotas. With the deepening of environmental protection efforts and growing public calls for better environmental quality, overall emission quantities should be on the decline in the future. Science-based adjustments of emission quantities according to environmental capacity can bring about continuous improvements of overall environmental quality, as well as indirectly increase the scarcity of pollution rights, increase the value expectations of companies for pollution rights and enhance the liquidity of pollution rights in the market.

Efforts should be made to avoid repetitive calculations of emission abatement qualities. Emission quotas or surplus quotas for trading must exclude existing emission abatement demand. For instance, China has already imposed emission caps for some industrial emission sources and thus further emission abatement must be made on the basis of satisfying existing emission caps before generating surplus quotas for trading. China has also identified the requirements on the phase-out of backward capacity and the emission abatement effects of capacity phase-out will be greatly compromised if emissions abatement resulting from capacity phase-out is used as abatement quotas or surplus quotas. Meanwhile, voluntary abatement or voluntary capacity phase-out outside from current policy requirements can be used as surplus quotas for trading.

Different from greenhouse gas emissions, conventional pollutants differ greatly across different regions, which should be taken into account in establishing abatement targets and conducting emissions trading in order to mitigate the post-trading negative impacts of emissions on humans. The government should identify expired quotas and revoke them on a regular basis to prevent any significant time span between emissions abatement and new emissions.

**Third, ensure accuracy of monitoring.** A pollution rights trading system provides companies with sufficient freedom to cut emissions in a manner that best suits them, but such a choice is based upon accurate monitoring. In implementing a pollution rights trading system, the US has prescribed strict and specific requirements on the monitoring of pollution sources and identified the accurate monitoring and timely reporting of emissions as important safeguards of pollution rights trading system. A continuous emission monitoring system has been put into place to ensure the accuracy and reliability of baseline emissions and actual emissions of pollution sources. Most of the pollution rights trading activities are related to the major point sources of nitride oxides and sulphur dioxide, considering that these sources can be monitored using a continuous emission monitoring system.

First, competent authorities need to carry out a strict certification and regular inspections on the continuous emission monitoring system to ensure the quality of its operation. According to the US experience, the monitoring data of continuous emission monitoring system should be calibrated according to such data as fuel consumption record and operational status (such as temperature and air surplus factor) to confirm that the monitoring data are within a reasonable range. Second, calibration of a certain duration (such as seven days) should be carried out in the initial stage of system installation and continuous emission monitoring system should be calibrated using standard gases and standard methods once or twice each year. Third, the negative deviations of continuous emission monitoring system should be compensated based on calibration results. Implementation of a certification and verification system can effectively prevent emissions data misstatements and incentivize companies to improve the operational quality of the continuous emission monitoring system from its own perspective.

**Fourth, impose strict penalties on violations.** Like other air quality management policies, the pollution rights trading system has also adopted the method of progressive penalties, whereby

the level of penalty is increased depending on the nature and magnitude of violations on the basis of universal penalty standards. Minimum economic penalties should be no less than the installation and operational costs of emission control equipment. Under the pollution rights trading system, minimum economic penalties can be two to three times the benchmark prices of pollution rights market. In the actual imposition of penalties, the value of penalties should be higher than the proceeds gained by companies from excess emissions. Otherwise, despite the penalties, companies with excessive emissions will also be able to profit from such violations. Companies that violate the rules of pollution rights trading can be subject to the revocation of trading qualifications and administrative mandates of emissions abatement.

**Fifth, cross-regional pollution rights trading can be piloted for major water basins and key regions of air pollution.** In some regions with serious air pollution such as the Beijing-Tianjin-Hebei Region, the costs of pollution treatment differ across cities with different development levels and air pollution treatment capabilities. The same amount of investments will lead to different pollution abatement effects in different regions. In order to maximize the benefits of pollution abatement with the limited funding, it is necessary to explore pollution rights trading within the region, create a joint fund for regional pollution treatment and prevention, and give priority support the measures and projects with the highest abatement performance. This model also applies to the water pollution control for water basins.

The intensity of air pollution differs across time and space, and the concentration of pollutants may spike in specific seasons or during specific hours of each day. Such differences must be taken into account in designing the pollution rights trading system and the post-trading impacts of emissions on humans should be minimized where possible. Priority should be given to the sales of emission permits by upwind or populous regions to downwind and uninhabited regions; pollution rights trading within a specific region (such as the Beijing-Tianjin-Hebei Region) may also be considered.

In addition, it is necessary for the government to carry out air quality simulation prior to implementing pollution rights trading for multiple pollutants in order to ensure that air quality will not deteriorate as a result of trading. Although it is unlikely to separately simulate all trading activities, sensitivity analysis can be carried out using air-quality models. For instance, rules for emissions trading for nitride oxides and evaporative organic matters within a region can be determined based on the analysis of the sensitivity of ozone emissions to the emissions of nitride oxides and evaporative organic matters.

Efforts must be made to ensure that no significant time span exists between additional emissions generated by the purchase of emission quotas and emission abatement through sales of emission quotas. If a cap-limited company manages to sell emission quotas and achieves emission abatement in the first year, while companies that have received quotas will not start using these quotas in the fourth year, the public would feel that air quality worsens in the fourth year. The



government may check quotas that have been unused for an excessive period of time and revoke them to prevent the aforementioned situation.

**Sixth, establish a pollution abatement fund to stimulate private investments in environmental protection.** According to the *Guiding Opinions of the State Council General Office on Further Promoting the Pilot Programs of the Paid Use and Trading of Emission Rights*, the fees for pollution rights should be collected by local environmental protection departments according to their authority for pollution source management, paid into local coffers and brought under the management of local fiscal budget. Revenues from pollution rights transfer should be used for pollution prevention and treatment. If this part of the funds is used for environmental interest rate discounts or injected into pollution abatement funds as initial funds with private capital participation, private investments in environmental protection will be effectively induced.

## THE GREEN FINANCE TASK FORCE

The Green Finance Task Force was initiated by People's Bank of China (PBC) Research Bureau and the UNEP Inquiry into the Design of a Sustainable Financial System in 2014. The Task Force brought together leading Chinese financial policy and regulation experts together with experts from the private sector, academia and think tanks, as well as international experts.

A number of organizations have lent great support to this Task Force, chief among them are Chongyang Institute for Financial Studies of Renmin University, the Ecological Finance Research Center at the Renmin University of China, the Eco Forum Global, the International Institute for Sustainable Development, the Green Credit Special Committee of China Banking Association, and China Finance 40 Forum.

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