Carbon Market Financial Innovation in China

DRAFT TECHNICAL NOTE

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Contents

Executive Summary

The development of carbon markets in China has been moving forward at an unprecedented pace. As of December 1, 2014, the combined market value of the Chinese emissions trading pilots had reached CNY 536 million (USD 86.5 million), and the combined trading volume reached 14.4 million tCO_2. The early operational experience gained by market participants in the pilots and the strong political will demonstrated by national authorities to establish a nation unified carbon market[1], encouraged a number of carbon finance innovations by those "early birds" (see in Annex) who wish to test ideas and secure a competitive edge for the future.

So far, a series of carbon finance innovations, including carbon funds, emissions allowance pledge loans, green structured deposits, emissions allowance trusteeship, and Chinese Certified Emissions Reduction (CCER) pledge loans, have been announced in three pilots in China, namely Hubei, Shenzhen, and Shanghai. In Hubei, the first carbon fund was registered, and financial institutions were authorized to engage in emissions allowance pledge loans, in particular thanks to the issuance of rules for allowance trusteeship. In Shenzhen, innovative green structured deposits linked to allowances were launched, and allowance trusteeship was authorized. In Shanghai, the first CCER pledge loan was introduced.

This briefing paper aims to provide an overview of the latest innovative financial instruments and vehicles supporting carbon markets in China based on publicly available information.

The carbon finance innovations in the ETS pilots in China up to December 2014 listed above can be divided into two categories: financing and investment, with the former used to raise capital, and the latter used to increase investment income through the carbon market.

Innovations aiming at financing

These include emissions allowance pledge loans, CCER pledge loans, and carbon bonds. Allowance and CCER pledge loans consist of obtaining loans by using allowances or CCERs as pledge, thereby enabling holders of carbon assets (i.e. allowances or CCERs) to obtain financing against the value of these assets. Carbon bonds are used to enhance the financing capacity of enterprises to invest in carbon emissions reduction projects by combining debt

[1] This could be reflected in the adoption by the National Development and Reform Commission of a national regulation for a national ETS in December 2014, which lays the groundwork and rules for the future national ETS, as well as the announcement of a timeline to launch the national ETS in 2016.

income with income from revenue from existing allowances or CCERs generated from the projects.

Innovations aiming at investment

These include carbon funds, green structured deposits, and emissions allowance trusteeship. In the case of the first two, investment institutions raise capital to invest in carbon markets (i.e. including both allowance and CCER markets). Existing carbon funds are mostly privately operated and targeted to the public. In the case of emissions allowance trusteeship, emitters assign the management of their carbon assets to financial institutions which will seek gains through trading in the carbon market.

Table 1 summarizes the carbon finance innovations Hubei, Shenzhen, and Shanghai have made so far. As can be seen, Hubei and Shenzhen are the most active.

Table 1. Carbon Finance Innovations in Pilot Regions (as of Dec. 15, 2014)

Pilot		Hubei	Shenzhen	Shanghai
Financing	Emissions allowance pledge loan	√		
	Carbon bond	√ Intended but not yet issued	√ CCER bond	
	CCER pledge loans			√
Investment	Carbon fund	√	√ Capitalization figures have not been published	
	Green structured deposit		√	
	Emissions allowance trusteeship	√	√ In course of implementation	

1 Emissions Allowance Pledge Financing

Emissions allowance pledge financing is an innovative means to raise money in the carbon market by using allowances as collateral. By pledging allowances to financial institutions (banks or brokers), emitters can obtain loans for the discounted valuation of the allowances, and pay a certain amount of interest when paying back the loans.

Three stakeholders are involved in each of these loan transactions: covered entities under the ETS, financial institutions, and local emissions exchanges. As the pledging party, emitters obtain loans by pledging allowances and pay interest to the financial institutions and storage fees to the exchanges. As the pledged party, financial institutions earn interest by providing loans to emitters. As a third-party platform, exchanges charge emitters storage fees by offering allowance registration and sequestration services. The relationships between the three parties in an emissions allowance pledge loan transaction are as shown in Figure 1 below.

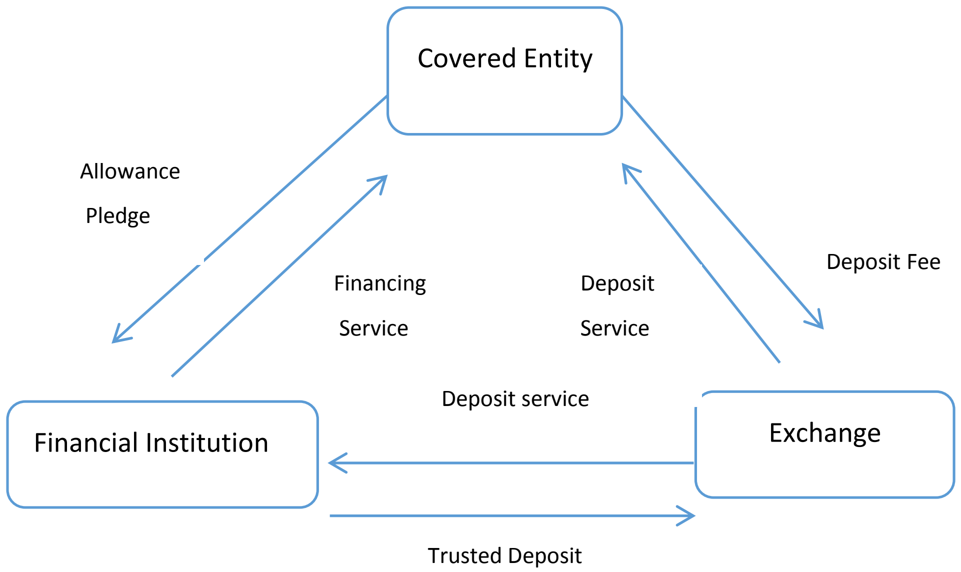

Figure 1. Relationship between Parties in an Emissions Allowance Pledge Loan

As of December 2014, three emission allowance pledge loans have been issued, all in Hubei:

On September 9, 2014, the Hubei Carbon Emissions Exchange, the Wuhan Branch of the Industrial Bank, and the Hubei Yihua Group signed a carbon asset pledge loan and carbon finance strategic cooperation agreement. By pledging its emissions allowances, Yihua Group obtained a loan of CNY 40 million (USD 6.5 million) from the Industrial Bank. The transaction used emissions allowances as the only guarantee, making it the first emissions allowance pledge loan in China. To apply for the loan, Hubei Yihua Group pledged 2.109 million tCO_2 of allowances, the standard valuation of which is CNY 23.7 (USD 3.8) per ton, the average price in Hubei's secondary carbon market since it was launched. The CNY 40 million (USD 6.5 million) size of the loan is from the total allowance valuation multiplied by the general loan coefficient of 0.8. The allowance pledge period is equal to the loan term, which is one year.

On November 26, 2014, at the signing ceremony for Hubei Innovative Carbon Finance Projects held at the Hubei Carbon Emissions Exchange, two emissions allowance pledge loan agreements were signed: a CNY 300 million (USD 48.4 million) agreement between the Hubei Branch of the China Construction Bank and Wuhan Huaneng Power Company, and another CNY 100 million (USD 16.1 million) agreement between the Wuhan Branch of the China Everbright Bank and Hubei Jin'ao Technology and Chemical Company. Although these two loans are much larger than the first loan mentioned above, they are different in that the first CNY 40 million (USD 6.5 million) loan uses allowances as the only guarantee while the latter two use a combination of allowances and fixed assets as pledges. To be more precise, the guarantee for these two loans includes all of the emissions allowances the companies hold, and some of their fixed assets, with fixed assets constituting the large majority of the guarantee. For example, emissions allowances only account for about 10% of the entire pledge provided by Hubei Jin'ao Technology and Chemical Company for its loan.

2 CCER Pledge Financing

CCER pledge financing is an innovative means to raise money in the carbon market, using CCERs as collateral. By December 2014, the pilots only experienced once CCER pledge loan, from Shanghai:

On December 11, 2014, the Bank of Shanghai and Shanghai Treasure Carbon New Energy Environmental Protection Technology Company Limited (Shanghai Treasure Carbon) signed a CCER Pledge Loan Agreement at the Shanghai Environment Energy Exchange, the first CCER pledge loan in China. Pledging several hundred thousand tons of CCERs, Shanghai Treasure Carbon obtained a loan of CNY 5 million (USD 806.5 thousand) from the Bank of Shanghai. The CCERs in question come from a few of the first ten emissions reduction projects filed by the NDRC in November 2014. This transaction used CCERs as the only guarantee. The standard price for CCERs in the transaction was based on the weighted average price of emissions allowances in the seven pilot trading markets. As a third party in this deal, the Shanghai Environment Energy Exchange will freeze and thaw associated CCERs and provide other services and operations as needed.

The CCER pledging operating model is similar to that of emissions allowance pledge financing as described in the preceding section, but they differ in the following aspects:

1. Pledged collateral: CCER pledge financing uses CCERs issued by NDRC, and emissions allowance financing uses emissions allowances issued by pilot authorities.

2. Participants: Enterprises possessing CCERs, either carbon asset companies or companies who own CCERs, participate in CCER pledge financing, and covered enterprises in pilot regions are the participants in emissions allowance financing.

3. Carbon asset valuation: Compared to direct valuation of allowances according to the existing market price, the valuation of CCERs is more complex. One the one hand, currently there is no public transparent market price for CCERs, and on the other, as a result of different policies on CCER use in each of the pilot regions, there is a large difference in the CCER prices of different kinds of projects. Since CCER prices are correlated to allowance prices, the first domestic CCER pledge loan used the weighted average price of allowances in all seven pilot markets as its valuation basis.

4. Risk: The main risk of allowance pledging comes from allowance price that is dependent on the pilot market supply and demand. CCER pledging faces more complex policy risks such as project type, CCER price, and pilot and national policies.

So allowances pledging has lower risk, is simpler to operate, and is more replicable than CCER pledging.

3 Carbon Bonds

Enterprise carbon bonds are bonds issued by financing institutions which meet the requirements of bond regulation and are related to the operation and management of carbon assets[2].

On May 12, 2014, CGN Wind Energy Limited, Shanghai Pudong Development Bank, China Development Bank, CGN Finance Co. Ltd., and Shenzhen China Emissions Exchange held a joint press conference to announce the issuance of China’s first carbon bond.

This five year carbon bond, worth CNY 1 billion (USD 161.3 million), is issued by CGN Wind Energy Limited. Shanghai Pudong Development Bank and China Development Bank are the main underwriters, while CGN Finance Co. Ltd. and Shenzhen China Emissions Exchange will offer financial consultancy. The interest rate of this bond adopts a combination of “fixed

[2] Report on China’s Carbon Finance Development in 2014

interest rate and floating interest rate", with the fixed rate as 5.65%, and the floating rate positively linked with the CCER gains of the 5 wind power project subsidiary companies under CGN Wind Energy Limited during the five year bond period. The floating interest rate is set between 5 BP (basis points) and 20 BP: if the CCER earnings are less than CNY 500,000 (USD 80,645), the rate will be 5 BP; if the earnings are between CNY 500,000 (USD 80,645) and 2 million (USD 322,581), the rate will be set proportionately between 5 BP and 20 BP; if the gains exceed CNY 2 million (USD 322,581), the rate will be 20 BP. As a result, the ultimate interest rate will be between 5.7% and 5.85%. The relationship between the interest rate and the CCER earnings is shown in Figure 2 below.

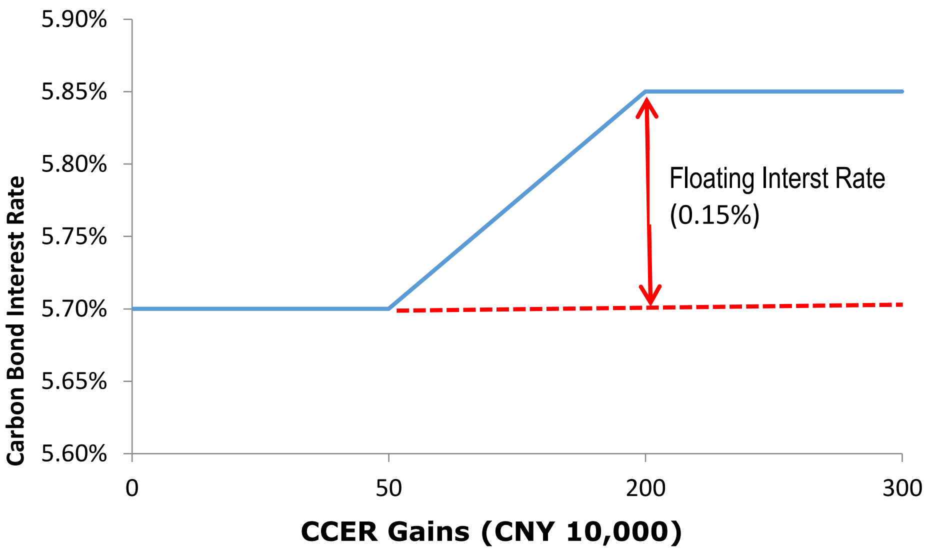

Figure 2. Relationship between the Interest Rate of the Carbon Bond Issued by CGN Wind Energy Limited and CCER Gains

On November 26, 2014, during the signing ceremony for Hubei Carbon Financial Innovation Projects held at the Hubei Carbon Emissions Exchange, Hubei Huadian Power Company Limited and the Wuhan Branch of China Minsheng Bank signed an agreement of intent for cooperation on carbon bonds worth CNY 2 billion (USD 322.6 million). This would not only be the first carbon bond in Hubei, but also the largest in China so far. The specific operating model and issuance date are yet to be publicized. Hubei Huadian Power Company Limited is a covered emitter under the Hubei pilot ETS. It is also unknown whether and how the return rate of this bond is linked to allowance trading income. Compared to allowance bonds, due to the price difference between the primary and secondary markets, investment returns for CCER bonds are more predictable.

4 Carbon Funds

Carbon funds are those established to invest in carbon markets. Previously, mainstream international carbon funds invested in the Clean Development Mechanism (CDM) carbon market. Depending on their source of capital, carbon funds can be classified as public carbon funds, private equity carbon funds, and public-private mixed funds. Private equity funds are currently the main kind of carbon fund in China. Since China's domestic carbon market includes seven pilot allowance and CCER markets, carbon funds can be invested in either allowance markets or CCER markets or both.

As of December 2014, two carbon funds were created, namely the Lion Asset Management Carbon Fund which has been registered and plans to invest in the Hubei carbon market, and the Jiatan Kaiyuan Carbon Fund which has completed its fundraising road show and plans to invest into three pilot allowance and CCER markets.

Lion Asset Management Carbon Fund, capitalized at CNY 30 million (USD 4.8 million), was jointly launched by the Huaneng Group and Lion Fund on November 26, 2014. It is the first domestic carbon fund registered by a regulatory authority. The fund is managed by the Lion Asset Management Company Limited, a subsidiary of the Lion Fund. Huaneng Asset Company Limited will provide investment consultancy on long-term as well as short- and medium-term investments with its carbon trading team.

From October 13 to November 7, 2014, the first domestic private equity fund "Jiatan Kaiyuan Fund" began to raise money officially. Road shows were held in Shenzhen, Wuhan, and Beijing. However, fundraising results have not been disclosed. Issued by Shenzhen Jiatan Asset Management Company Limited, this fund includes the "Jiatan Kaiyuan Investment Fund" and "Jiatan Kaiyuan Balance Fund", targeting the CCER and allowance markets respectively. According to the fundraising rules, the two separate funds aim to raise CNY 40 million (USD 6.5 million) and 10 million (USD 1.6 million) respectively. The design model of the two funds is shown in Table 2 below.

Table 2. The Design of the Jiatan Kaiyuan Fund

Name	Target Market	Fund Scale	Minimum Requirement for Limited Partners	Operation Term	Expected Annual Return Rate	Note
Jiatan Kaiyuan Investment Fund	CCER	CNY 40 million (USD 6.5 million)	CNY 500,000 (USD 80,000)	3 years (by investor consent, can be extended by up to 2 years)	28%-45%	The return, if conservatively estimated, will mainly come from the direct sale of CCERs in the secondary market; if optimistically estimated, it will come from the sale of allowances from swap trading at the price of CNY 50 (USD 80). CCER projects have two income models: direct purchase and investment.
Jiatan Kaiyuan Balance Fund	Allowance markets in Shenzhen, Guangdong, and Hubei	USD 10 million (USD 1.6 million)	CNY 200,000 (USD 32,000)	10 months	25.6%-47.3%	In the Shenzhen market, the planned purchase price is CNY 40-45 (USD 6-7), and the selling price is CNY 55-60 (USD 8-10); in the Guangdong market, an auction is planned to be used, with the unit purchase price at CNY 32 (USD 5), and the selling price at CNY 40-50 (USD 6-8); in the Hubei market, the planned purchase price is CNY 27-32 (USD 4-5), and the selling price is CNY 38-48 (USD 6-8).

5 Green Structured Deposits

On November 26 2014, the Industrial Bank, Huaneng Carbon Asset, and Shenzhen China Emissions Exchange jointly launched the first domestic green structured deposit. Targeting covered entities in the Shenzhen pilot, this financial product is an upgrade of a normal bank deposit.

The operation model is as follows: the Industrial Bank collect deposits from covered entities participating in the Shenzhen pilot ETS, and authorizes Huaneng Carbon Asset, a professional carbon asset management agency, to use the collected deposit to manage the purchase and sale of carbon allowances in the secondary carbon market. For covered entities, the benefit of depositing money in the bank includes normal interest plus Shenzhen pilot carbon trading market emissions allowances. Covered entities thus provide money, through the bank, to carbon asset management institutions in return for interest and extra allowances. It is like outsourcing their carbon asset management business to professional agencies. Professional carbon asset management agencies could gain a profit through managing the deposit money and investing in the secondary carbon market. The financial institutions involved can obtain corresponding revenue by providing services to both covered entities and professional carbon management agencies.

Huike Electronics (Shenzhen) Company Limited deposited CNY 10 million (USD 1.6 million) in the Shenzhen Branch of the Industrial Bank. Besides deposit interest, Huike Electronics will also get no less than 1,000 tCO_2 of Shenzhen pilot market emissions allowances. The expected return rate is 4.1%, with 1.9% as a fixed interest rate and the remaining 2.2% as a floating rate, mainly linked to Huaneng Carbon Asset's trading profit.

6 Trusteeship of Emissions Allowances

Trusteeship of emissions allowances means that a trustee can hold the allowances of covered entities for an agreed period of time, and have the right to trade and manage the allowances. The purpose is first to increase liquidity in the carbon markets and also to assist covered entities in participating in the carbon markets. In the pilot markets, due to the lack of participation and capacity of covered entities, most trading takes place in a short period before the compliance deadline, resulting in poor liquidity.

In December 2014, Hubei and Shenzhen issued rules and started business for allowance trusteeship. After the summary below, Table 3 compares the key design features of allowance trusteeship in Hubei and Shenzhen.

(1) Allowance Trusteeship in Hubei

On December 8 2014, the Hubei Emissions Exchange issued *Implementation Rules for Allowance Trusteeship Business (On a Trial Basis)*, the first rules for allowance trusteeship in China, and announced the first two registered trustee institutions: Wuhan Gangshi Zhongxin Carbon Resources Management Company, and Wuhan Zhongxin Green Carbon Investment

Management Company.. On the same day, the first domestic carbon asset trusteeship transaction occurred, in which Hubei Xingfa Chemical Group Company Limited trusted 1 million allowances from December 8, 2014 to January 8, 2015.[3]

The basic procedure of allowance trusteeship in Hubei is as follows: after signing a trusteeship agreement, the trustee needs to report to the Hubei Carbon Emissions Exchange and submit enough money as a guarantee. The client covered entity should hand over the trading account of the carbon assets concerned to the trustee or directly transfer the carbon assets concerned to the account of the trustee. Supervised by the Exchange, the trusted account could not transfer money during the trusteeship. When the agreement is concluded, the trustee returns back the carbon assets to the client, and with the written confirmation of the client, the Exchange will set free the trusted account.

(2) Allowance Trusteeship in Shenzhen

On December 12, 2014, the Shenzhen China Emissions Exchange officially issued the *Rules for Managing Trustee Members of the Shenzhen China Emissions Exchange*. According to this document, an institution must become a trustee member of the Exchange in order to carry out trusteeship business. On December 3, by signing a Trustee Membership Agreement with the Shenzhen China Emissions Exchange, KOE Environmental Consultancy, Inc. became the first domestic trustee member of the Shenzhen China Emissions Exchange.

The trustee and the client need to sign an Allowance Trusteeship Agreement provided by the Shenzhen China Emissions Exchange, which includes: the volume of allowances trusted, agreed expiration date, benefit or loss sharing, as well as compensation when the agreed committed benefits cannot be fulfilled. When carrying out trusteeship business in Shenzhen, the trustee should commit that it will return a certain amount of allowances to the client at the expiration date of the agreement, and at the same time properly handle benefits or losses according to terms of the agreement. The trustee cannot transfer money out of the trustee account before the expiration date. After the expiration date, and also when the trustee returns the agreed allowances back to the client and fulfills its other commitments, or otherwise agree with the client when commitments could not be fulfilled, the trustee can apply to the Exchange for transferring money from the trustee account.

Trustee members should pay risk and default guarantees to the Exchange. For risk guarantee, they can choose either a lump sum payment of CNY 3 million (USD 130,073) or CNY 5 (USD 0.8) per ton of allowance. Default guarantee is CNY 500,000 (USD 80,645). If the trustee fails to fulfill its commitment, the Exchange will transfer the risk guarantee directly to the client according to the agreed compensation terms. If the risk guarantee is not enough for compensation, the client could continue to claim compensation through other means. The unused risk guarantee could be carried over for use in the next year, and returned to the trustee after it withdraws membership. If the trustee does not provide due compensation or cannot reach agreement on compensation with the client after it fails to fulfill its commitment, the Exchange will confiscate the default guarantee, and the money will be put into the

[3] http://mp.weixin.qq.com/s?__biz=MzA3ODA2NDYwOA==&mid=202399307&idx=1&sn=1f8806de778afab2d113a5527f0414a5&scene=0#rd

Exchange's risk disposal fund. The trustee member could apply for the return of the default guarantee after the expiration date of the agreement.

The Exchange also conducts rating of its trustee members by annual trading volume, and rewards those highly ranked with sharing commission bonuses and exemption part of their annual fees. The top ranking member with trading volumes over 400,000 tons of allowances could be exempted from 80% of the annual fee for the next year and also rewarded with 20% of the commission of that year. The member who ranks second and has over 300,000 tons of allowances traded or who ranks first and has between 300,000 and 400,000 tons of allowances traded will be exempted from half the annual fee for the next year and rewarded with 10% of the commission of that year. The Exchange will meet and discuss with the member who ranks the last on how to improve.

Table 3. Comparison of Allowance Trusteeship in Hubei and Shenzhen

		HUBEI	SHENZHEN
Trustee Management	**Management Method**	Registration	Membership
	Number restriction	No	10
	Registered Capital Requirements	No less than CNY 10 million (USD 1.6 million)	No
	Staff Requirements	Operation team should include at least one person who possesses a carbon trading certificate issued by the Hubei Carbon Emissions Exchange	At least 5 professional traders accredited by the Shenzhen Exchange
	Traded Allowance Volume Requirements	No	Over 200,000 tons annually (below 1 million tons trusted), or 20% of trusted volume (over 1 million tons)
	Fees	No	Domestic institutions, CNY 200,000 (USD 32,258) for membership fee and CNY 100,000 (USD 16,129) for annual fee; Foreign institutions, CNY 300,000 (USD 48,387) and CNY 150,000 (USD 24,194) respectively
	Rewards	No	Yes

	Trusted Allowance Volume Limits	10 million tons	No
	Capital Transfer Restrictions	During trusteeship, the account could not transfer money. After the expiration date, with written approval by the client, the Exchange will free the account to enable it to transfer money.	During trusteeship, money from trusted allowance trading could not be transferred. After the expiration date, the trustee could apply to the Exchange for transferring money only after it returns back to the client the allowance and fulfills other commitments.
Trusteeship Risk Management	**Guarantee System**	20% of the market value of trusted allowances will be charged as guarantee to compensate possible losses of client. During the trusteeship, when the total market value of the trusted account and the guarantee account is less than 110% of the trusted allowance market value, the account will be frozen until money added to reach the 120% standard; otherwise, the trusteeship will be terminated and the guarantee will be used to compensate the client.	Risk guarantee includes either lump sum payment of CNY 3 million (USD 130,073) or CNY 5 (USD 0.8) per ton of allowance; Default guarantee of CNY 500,000 (USD 80,645). Risk guarantee will be used to compensate client when trustee fails to fulfill its commitment. Default guarantee will be confiscated when the trustee fail to deliver.

ANNEX

Carbon Finance Innovations in China's Carbon Emissions Trading Pilots

Date	Pilot Region	Financial Innovation	Participating Financial/Investment Institution(s) and Their Role(s)	Participating Enterprise(s) and Their Role(s)	Participating Exchange(s) and Their Role(s)	Features
May 12, 2014	Shenzhen	Carbon bond (CCER)	Shanghai Pudong Development Bank, China Development Bank (underwriter)	China Guangdong Nuclear Power Company (issuer)	Shenzhen China Emissions Exchange (financial consultant)	China's first carbon bond
Sept. 9, 2014	Hubei	Emissions allowance pledge loan	Wuhan Branch of Industrial Bank (creditor)	Hubei Yihua Group (debtor)	Hubei Carbon Emissions Exchange (emissions allowance holder)	China's first emissions allowance pledge loan
Oct. 13 to Nov. 7, 2014	Shenzhen	Carbon fund (Jiatan Kaiyuan Fund)	Shenzhen Jiatan Capital Management Company Limited (fund manager)	/	Shenzhen China Emissions Exchange	China's first private equity carbon fund which closed financing in November, with results undisclosed

Nov. 26, 2014	Hubei	Carbon fund (Lion Asset Management Company Limited-Chuangying No. 1 Carbon Emissions Asset Management Plan)	Lion Asset Management Company Limited (fund manager), Huaneng Carbon Asset (investment consultant)	/	Hubei Carbon Emissions Exchange	China's first carbon fund registered in China Securities Regulatory Commission
Nov. 26,2014	Hubei	Emissions allowance pledge loan	Hubei Branch of China Construction Bank, Wuhan Branch of China Everbright Bank (creditor)	Wuhan Huaneng Power Company Limited, Hubei Jin'ao Technology and Chemical Company Limited (debtor)	Hubei Carbon Emissions Exchange	Combination of allowance pledge and fixed asset mortgage
Nov. 26, 2014	Hubei	Carbon bond	Wuhan Branch of China Minsheng Bank (underwriter)	Hubei Huaneng Power Company Limited (issuer)	Hubei Carbon Emissions Exchange	China's biggest contracted carbon bond (not issued yet)
Nov. 26, 2014	Shenzhen	Green structured deposit	Shenzhen Branch of Industrial Bank	Huike Electronic (Shenzhen) Company Limited (depositor)	Shenzhen China Emissions Exchange	China's first green structured loan
Dec. 3, 2014	Shenzhen	Emissions allowance trusteeship	KOE Environmental Consultancy, Inc. (trustee member)	No information	Shenzhen China Emissions Exchange	China's first trustee approved publicly by exchanges

					(trusteeship administrator)	
Dec. 8, 2014	Hubei	Emissions allowance trusteeship	Wuhan Gangshi Zhongxin Carbon Resources Management Company Limited/Wuhan Zhongxin Green Carbon Investment Management Company Limited (trustee)	Hubei Xingfa Chemical Group (trusteeship party)	Hubei Carbon Emissions Exchange (trusteeship administrator)	China's first allowance trusteeship business
Dec. 11, 2014	Shanghai	CCER pledge loan	Bank of Shanghai (creditor)	Shanghai Treasure Carbon New Energy Environmental Protection Technology Company Limited (debtor)	Shanghai Environment Energy Exchange (CCER holder)	China's first CCER pledge loan