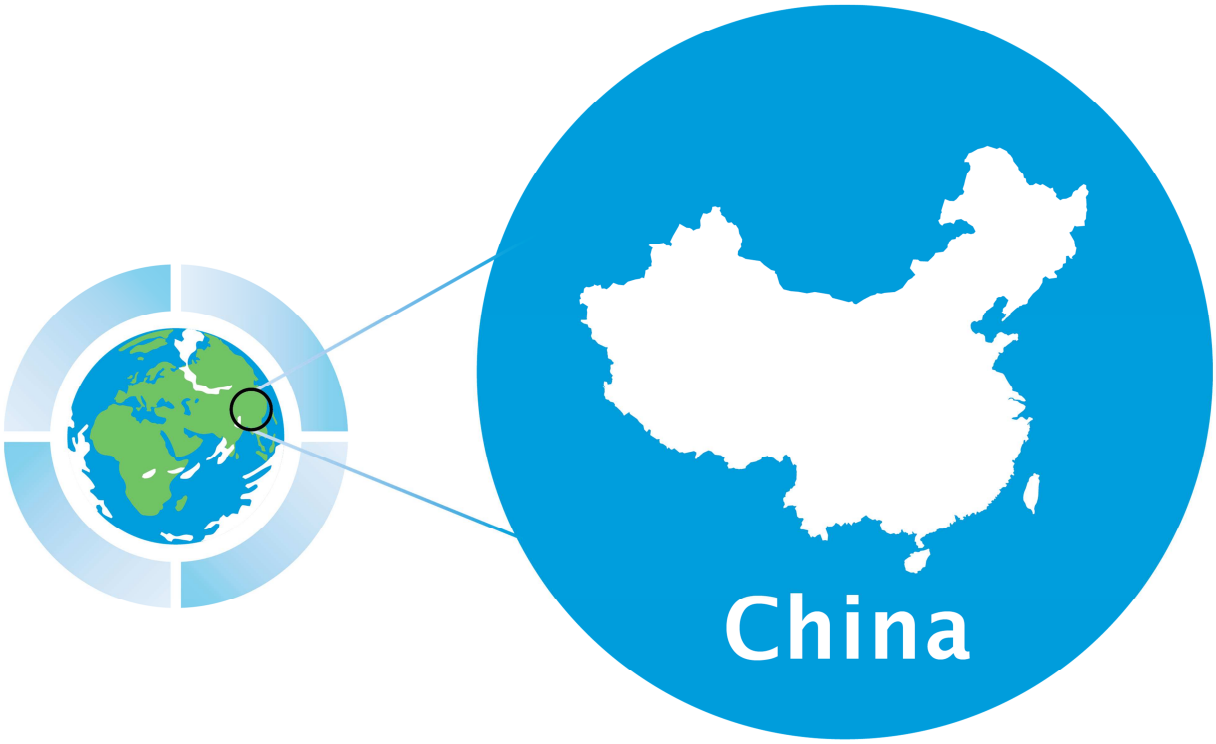
CHINA: AN EMISSIONS TRADING CASE STUDY



China: An Emissions Trading Case Study

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This case study incorporates all Chinese government measures over the past six years related to the development of China's emissions trading policies. The authors have reviewed all relevant government documents to inform this case study. It is divided into two parts: a summary of the seven ETS pilots in China to date, followed by a progress report on China's national emissions trading system (ETS) which is currently under development. This case study is a joint project of IETA and CDC Climat Research.

TIMELINE TO A NATIONAL ETS

- **December 2006:** Twelve departments and central government commissions published the National assessment report on Climate Change.
- **June 2007:** The NDRC unveiled its national Climate Change Program, identifying policies and activities to deal with the issues of climate change.
- **November 2008:** The NDRC published the first version of China's policies and actions on Climate Change, which is updated annually.
- **August 2009:** The Standing Committee of the National People's Congress released a Resolution, *Making Active Response to Climate Change*, requiring that the government's work plan integrate enacted climate-change related laws.
- **November 2009:** The State Council announced a carbon emission reduction target: reducing the intensity of carbon emissions per unit of GDP by 40-45%, compared to the level of 2005, by 2020.
- **November 2010:** The State Council announced its 12th Five-year plan (2011-15) requiring the development of emission trading systems (ETS) in China.
- **October 2011:** the NDRC published a Notice on carbon emissions trading pilots in which Beijing, Chongqing, Guangdong, Hubei, Shanghai, Shenzhen and Tianjin were assigned as ETS pilots.
- **November 2011:** State Council decision to gradually promote the establishment of a carbon emissions trading market.
- **December 2011**: the State Council unveiled the 12th five-year plan work program to control GHG emissions.
- **June 2013:** Shenzhen launched its ETS.
- **November 2013:** Shanghai pilot and Beijing pilot started.
- **December 2013:** Guangdong and Tianjin launched their ETSs.
- **April 2014:** Hubei launched its ETS.
- **June 2014:** The last pilot was launched in Chongqing.
- **August 2014:** the NDRC announced the National ETS will launch in 2016.
- **September 2014:** The NDRC released a notice on China's national climate change plan for 2014-20. [1]
- **November 2014:** Joint Sino-US statement on climate change where both heads of state announced their respective action on climate change beyond 2020.
- **November 2014:** the NDRC unveiled for public comment a draft notice on 10 national standards on GHG emission accounting methods and reporting guidelines.

- **December 2014:** The NDRC released the *Provisional measures for the administration of carbon emission rights trading* (high-level regulations on the national ETS).
- **January 2015:** the NDRC announced the launch of the national registry for voluntary emission trading[2].
- **February 2015:** The NDRC published a notice *Regarding the Fundamental conditions and operational thinking behind the promotion and establishment of the National carbon emissions rights trading market* (National Market Plan).

HISTORY BRIEF AND RECENT DEVELOPMENTS

In August 2002, China ratified the United Nations Framework Convention on Climate Change (UNFCCC)[3] However due to its UNFCCC Non-Annex I status, China currently has limited compliance obligations under the UNFCCC. Also since this time, China's economy has been in rapid development and has experienced a growth in emissions of 4.2% from 2012 to 2013, in which year China's CO_2 emissions rose to 9.98 GtCO2.[4] Currently, China is the world leader in carbon emissions[5] and was responsible for 28% of global emissions in 2013.[6] This high level of emissions can largely be attributed to China's carbon intensive economy and high energy intensity per unit of Gross Domestic Product (GDP), largely due to the dominance of coal in China's energy supply.

In June 2007, China began to progressively strengthen its commitment to climate change mitigation with the development of the country's first global warming policy initiative issued by the National Development and Reform Commission (NDRC). The *National Climate Change Program*, which highlighted policy measures that can lower GHG emissions to achieve a reduction target of 20% below 2005 levels by 2010 in energy consumption per unit of GDP.[7]

In addition, in November 2009, the State Council announced two 2020 targets during the UNFCCC's 15th Conference of the Parties to the Convention in Copenhagen (COP15):

- Reduce CO_2 per unit of GDP by 40-45% relative to 2005.
- Increase the ratio of non-fossil energy to 15% of primary energy consumption.

The following year in November, the State Council announced its 12th Five-year plan (FYP12 – from 2011 to 2015) [8] in which, for the first time, a national carbon intensity reduction target was explicitly introduced. Chapter 21 of the FYP12 calls for the implementation of market-based mechanisms such as emissions trading systems (ETSs) as a tool to achieve the energy and carbon intensity goals of the FYP12

In October 2011 the NDRC published a Notice that assigned the task of establishing ETS pilot programs to five cities (Beijing, Chongqing, Shanghai, Shenzhen and Tianjin) and two provinces (Guangdong and Hubei).[9] In November 2011, the State Council also released a white paper detailing *China's Policies and Actions for Addressing Climate Change* which outlined their intention to*:* [10]

- implement *low-carbon development pilots* by exploring local low-carbon development modes, policies, systems and mechanisms and speed up the establishment of industrial systems and consumption patterns and,
- gradually implement a *carbon emissions trading market* by taking into account international experience in order to "*realize the objective of controlling greenhouse gas emissions at minimum cost*".

In December 2011, the State Council unveiled its FYP12 work program to control GHG emissions.[11] Several goals were outlined that are expected to be achieved by the end of 2015:

- To reduce CO_2 per unit of GDP by 17% by the end of the 11th Five-Year Plan (FYP11).
- To reduce national energy consumption per unit of GDP by 16% relative to the end of FYP11 which, according to the NDRC, will lead to energy-saving capacity of 300 million tonnes of coal equivalent (tce).
- Increase the ratio of non-fossil energy to the consumption of primary energy to 11.4%.
- Increase average of new forests by 12.5 million hectares relative to the end of FYP11, with forest growing stock increasing by 600 million cubic meters and forest coverage rising to 21.66%.[12]
- Increase the ratio of renewable energy by 9.5% as a share of total primary energy consumption (478 million tce).

The main objective of the establishment of pilot ETS programs was to learn lessons through experience and to facilitate the development of a national-scale system expected to commence during the 13th Five-year Plan (FYP13), which will span the 2016-20 time period. The seven pilots each started their operations between June 2013 and June 2014 (see section on ETS pilots).

In November 2014, the United States and China released a joint-statement on climate change where both heads of state announced their respective action plans on climate change beyond 2020.[13] China's statement involved measures to:

- peak its CO_2 emissions by 2030 and try to reach this peak as early as possible; and
- raise the share of non-fossil fuels in primary energy consumption to 20% by 2030;

In December 2014, the NDRC released the *Provisional measures for the administration of carbon emission rights trading* that are the first legal elements of the national ETS that will be implemented from 2016.[14] This announcement was completed in February 2015 by the NDRC's notice covering the national market plan framework and its timeline.[15] In March 2015, funding from the World Bank's Partnership for Market Readiness (PMR) project began, which is helping to develop the national ETS[16].

At present, China has a vast experience with climate change-related market mechanisms, through the CDM, the establishment of voluntary emissions trading, implementation of ETS pilots and its preparation for a national ETS, beginning with FYP13.

FIRST STEP: AN EXPERIMENT WITH ETS PILOTS

NDRC guidelines

In October 2011, the NDRC published a Notice on carbon emissions trading pilots regarding the launch of the seven pilot systems, which were scheduled to start between June 2013 and June 2014. Cumulatively the seven ETSs cover 1,159 $GtCO_2e$[17], together placing them as the world's second-largest ETS. In 2016, the national ETS is expected to commence and the design of this system will be largely based on the experimentation of these seven pilots.

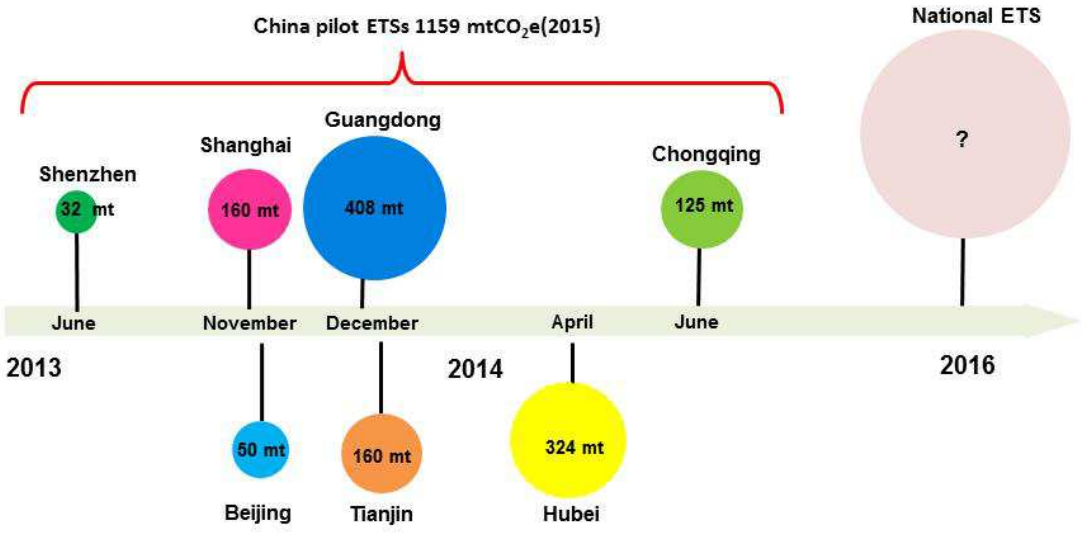

Figure 1: ETS pilot timeline and emission caps

Source: *CDC Climat Research*

Figure 2: Map of approved pilot carbon trading systems in China
Source: *IETA, 2013*

The provinces and municipalities of these pilot programs were carefully selected. The selection of the seven pilots was based on two main criteria: one was the willingness of provincial leaders to have an ETS pilot within their territory; the second was the need to represent a variety of Chinese economic, social, and geographic criteria. Indeed, the seven pilots cover a wide range of different economic, industrial and geographic circumstances. Together, they comprise about 25% of the country's annual GDP, and they represent the spectrum of economic development and wealth within the country. In addition, the pilot ETS for Shenzhen, which is a city located within Guangdong, will be subject to Guangdong's ETS as well as its own program. As a result, Shenzhen has the unique task of developing a system that is different from, but compatible with, the Guangdong system. Running pilots in diverse regions, and thereby educating policymakers about what types of programs best suit specific types of regions, is intended to aid the country's national ETS planning process.[18]

Cities included in the pilot ETS's are under the National Central Authority and thus have the same level of independence as the provinces.

The NDRC guidelines help structure the overall design of the pilot programs by requiring that each of the two provinces and five cities set:

- an emissions cap;
- an allowance allocation methodology;
- a monitoring, reporting and verification (MRV) system;
- an emissions registry, covering allowances and Chinese Certified Emission Reductions (CCERs) trades; and,
- an emissions trading platform (for allowances and CCERs).

Common features of the seven ETSs

Whilst each province and municipality government has the flexibility to design its ETS pilot's features according to local circumstances, there are some common features among them. These can be considered as common "*basis*" features: common sectoral coverage, the use of free allowances, CCERs, and flexible provisions such as banking of allowances. Furthermore, all seven pilot ETSs cover both direct emissions from fossil fuel use and emissions attributable to electricity use, including those from electricity generated outside their boundaries.[19]

Common sectoral coverage – power sector and industrial sectors

All seven pilot systems also cover the power sector and a wide array of industries. Only in the Chongqing ETS does ambiguity exist on the policy coverage of the power sector. Article 4 of the detailed allowances allocation regulation[20] defines the Chongqing pilot's scope and covers only industry sectors: electroplated aluminum, metal alloy, calcium carbide, caustic soda, cement, steel and iron. Regardless, the emissions reporting and verification guidelines related to industries includes power producers (coal, electricity and gas).[21] However, the verification step is only an obligation for ETS pilot covered enterprises. In September 2014, the list of companies subjected to a verification process was published and included four electricity producers.[22]

Allocation approaches – Use of free allowances and of auctioning

Participants in all the ETS pilots have been allocated all or the majority of their allowances for free. Six of the systems allocated 100% of allowances for free with the exception of Guangdong which will auction 10% of the allowances in 2015.

Allocated allowances are primarily based on historical emissions data. The local authorities of each pilot are responsible for defining the baseline years. While allocation methodologies vary among the Chinese ETS pilots, most use grandfathering, where the total amount of allocations is equal to the amount of historical emissions multiplied by a reduction factor.

	Free allowances		**Auctioning**
	Grandfathering	**Benchmark**	
Beijing	all covered sectors	new entrants and expanded capacity	small proportion of allowances
Chongqing	all covered sectors*	-	no
Guangdong	power (Combined Heat and Power units), cogeneration, mining in cement, petrochemical, iron, streel scrap processing	power (coal and gas fired units), cement and long process steel, new entrants	Auctioning is used as a complementary method (2014 compliance floor price is ¥25 for the first auction of the year, climbing to ¥40 for the final one)
Hubei	all covered sectors	-	3% of this reserve can be auctionned (floor price ¥20)
Shanghai	industrial, manufacturing and public buildings	energy, airlines, ports and airpots	Auctioning is used as a complementary method only to fulfill compliance obligation (2013 compliance floor price: ¥46)
Shenzhen	-	all covered sectors	Auctioning used as a complementary method only to fulfill compliance obligation (2013 compliance floor price ¥35.4)
Tianjin	all covered sectors	new entrants and expanded capacity	small proportion of allowances
** Chongqing is using current-emissions based updating. Allowances are going to be determined ex-post after production data has been shared*			

Table 2 – Allocation approaches for each pilot ETSs

Source: *Ecofys, April 2014, and ICAP, February 2015.*[23]

Use of flexible provisions and cost-containment mechanisms

- **CCERs:** all pilots permit the use of CCERs to a different degree. CCERs must first meet the requirements of China's national verification regulation.

  China began working on a draft CCER regulation in 2009 and, in June 2012, the NDRC issued the *Interim measures for the management of voluntary GHG emission reduction transaction*[24] which is the basic framework for the offset mechanism (CCER). The offset mechanism covers six GHGs: CO_2, CH_4, N_2O, HFCs, PFCs, SF_6. On October 2012, the *validation and verification of voluntary GHG emission reduction guidelines*[25] launched an online platform for CCER trading.

  Emission reduction projects located in China can be submitted to the national registration system. First, projects must obtain approval from one of the nine validation and certification agencies mandated by the NDRC. Thereafter, approved projects are registered within the national offset registry and can generate CCERs.

  The **CCER methodology approach is similar to the Clean Development Mechanism** (CDM).[26] By February 2014, 178 methodologies were recorded, of which 173 originated directly from CDM methodologies and 5 from LULUCF project types. [27] At the same time, some differences exist whereby CCER methodologies do not require the implementation of a standing support structure or the review of procedures. In addition, the system is free of charge for project owners. These differences have been implemented to reduce transaction costs for all participants in the project cycle while ensuring the quality of projects and CCERs.[28]

	$CCER_S$ limit (%)	Geographical requirements	Specific requirements	Whether the participant can use their own CCER for offsetting
Beijing	5	At least 50% from Beijing	- prohibit projects generating HFCs, PFCs, N2O, SF6 and water energy projects - CCERs issued before January 1st, 2013 can not be used	no
Chongqing	8	Only from Chongqing	- prohibit hydropower projects - projects must have entered into operation after December 31st, 2010	-
Guangdong	10	At least 70% from Guangdong	- at least 50% of the projects should be from CO2 or CH4 emission reduction activities - prohibit: (1) hydropower projects; (2) projects of power generation, heat supply or waste energy recovery whose emission reduction caused by the use of coal, oil or gas; (3) pre-CDM projects	no
Hubei	10	Only from Hubei	-	-
Shanghai	5	-	CCERs issued before January 1st, 2013 can not be used	no
Shenzhen	10	-	-	no
Tianjin	10	-	-	-

Table 3 – Differences on offset mechanism in pilot ETS

Source: *NDRC, Liu Feng, Update on China's Carbon Market, presentation, May 2014, additional information from ideacarbon.org and from personal communications, March 2015*

- **Banking and borrowing:** all pilots authorize banking, but allowances cannot be carried forward beyond 2015. Borrowing is not allowed.

Compliance and MRV key dates for each ETS

	Beijing	Chongqing	Guangdong	Hubei	Shanghai	Shenzhen	Tianjin
Compliance date	*June 27*	*June 20*	*June 20*	*Last working day in May*	*June 30*	*June 30*	*May 31*
Submission of annual monitoring plan	-	-	-	-	*December 31*	-	*November 30*
Submission of emission report	*February 28*	*February 20*	*March 15*	*February 28*	*March 31*	*March 31*	*April 30*
Submission of verification report	*March 20*	-	*May 5*	*April 30*	*April 30*	*April 30*	*April 30*

Table 4 – Compliance and MRV key dates for each ETS pilot

Source: *NDRC, Liu Feng, Update on China's Carbon Market, presentation, May 2014 and NDRC, Wang Shu, update on development of Chinese ETS, presentation of November 2nd 2014.*

Carbon trading and price outlook in 2014

By the end of October 2014, the total trading volume of CO_2 reached 13.75 million tonnes of CO_2) and the turnover was more than 500 million yuan. A total of 15.21 million quotas have been sold in 2014 at various ETS pilot auctions for a financial sum of 760 million yuan.[29]

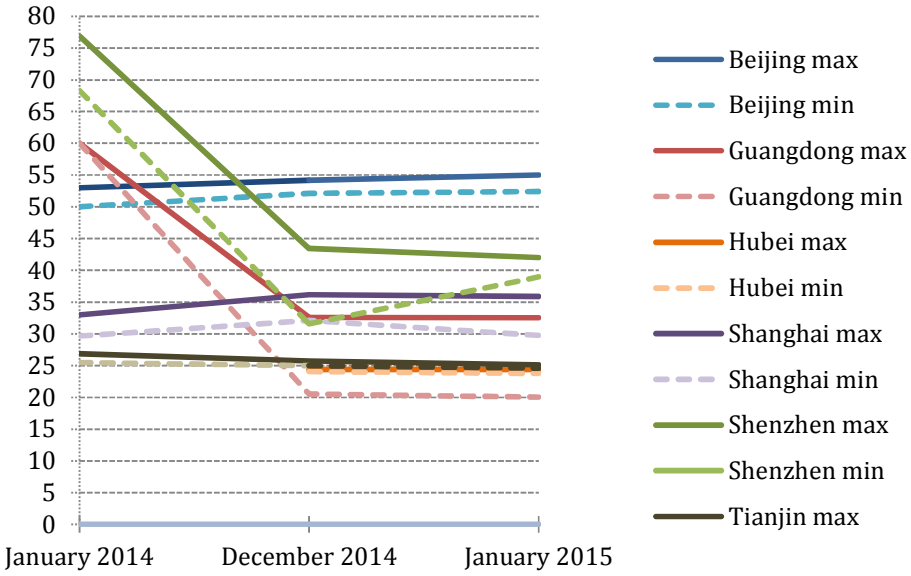

Figure 2 – Carbon price trends in each ETS pilots[30]

Source: *China carbon, http://chinacarbon.net.cn/wp-content/uploads/2015/02/China-Carbon-Market-Review_January-2015.pdf, January 2015*

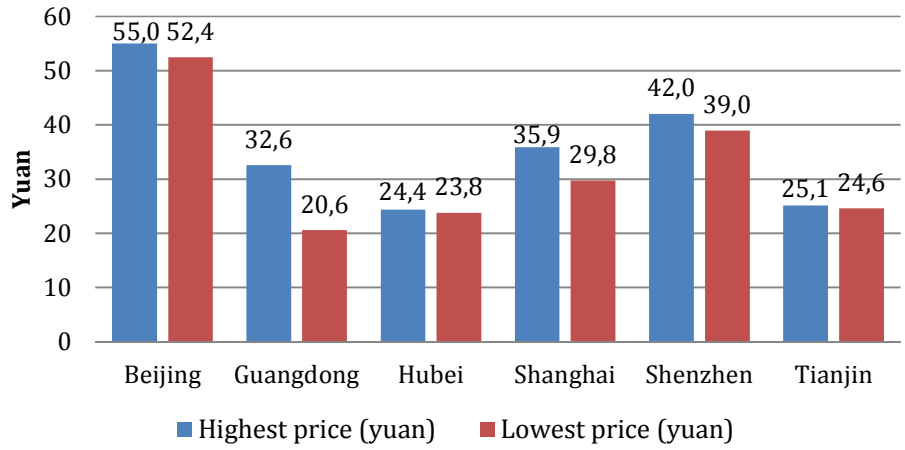

Figure 3 – Carbon price for each ETS pilot in January 2015

Source: *China carbon, http://chinacarbon.net.cn/wp-content/uploads/2015/02/China-Carbon-Market-Review_January-2015.pdf, January 2015*

More pilot emissions trading systems, more momentum

Since the NDRC's decided to implement seven ETS pilots, other regions in China are determined to implement their own ETS experiments as well. In June 2013, the Hanghzou government was the first in China outside of the seven pilots to unveil its regulations on emissions trading.[31] Hangzhou was followed by the Qingdao government approving plans to launch an emissions trading system in October 2014. During the same month the Zhejiang government approached the Hubei Development and Reform Commission to join its market.[32] Finally, in March 2015, Gansu and Anhui governments announced their intention to launch a pilot carbon exchange in 2015.[33]It remains to be seen what role these voluntary pilots will play in the lead up to a national ETS in the years ahead.

Summary of key policy features for each ETS – Table 5

	Beijing	Chongqing	Guangdong	Hubei	Shanghai	Shenzhen	Tianjin
Trading period	2013-2015	2013-2015	2013-2020	2013-2015	2013-2015	2013 – 2015	2013 – 2015
Emission target (intensity-based)	18% over 2010 levels	17% over 2010 levels, with a further goal of increasing forestry coverage from 39% to 45%	19% over 2010 levels	17% over 2010 levels	19% over 2010 levels	21% over 2010 levels	19% over 2010 levels, with a further goal of less than 1.69 Ton/CO_2 per 10,000 RMB GDP
Emission type	CO_2 Direct (electricity generation and heating) and indirect (manufacturing, public buildings)	CO_2 (direct and indirect), CH_4, N_2O, HFCs, PFCs, SF_6	CO_2 (direct and indirect)	CO_2 (direct and indirect)	CO_2 (direct and indirect)	CO_2 (direct and indirect)	CO_2 (direct and indirect)
Emissions threshold	> 10,000 tons CO_2 per year as the average from 2009 to 2012	>20,000 tons CO_2 in any year between 2008 and 2012	> 10,000 tons CO_2 per year or from 2010 to 2012 for industrial sectors >5,000 tons Co_2 for other sectors	> 60,000 tons coal consumption (= 150,000 Co_2) for major sectors in 2010 or 2011. Enterprises with + 8,000 tons coal consumption will join at later stage	>20,000 tons CO_2 per year for major sectors in 2010 or 2011 >10,000 tons per year for other sectors	>3,000 tons CO_2 per year >10,000 m^2 Public use building	>20,000 tons CO_2 per year in any year since 2009.
Allowances Issued for 2013-2014	Not released	About 125 Mt CO_2, 4.13% annual reduction	388 Mt CO_2/year for 2014 (350M allowances + 28M reserve)	324 Mt CO_2 for 2014	About 150 Mt CO_2 for 2013, may be adjusted ex-post	About 100 Mt CO_2 in total for 2013 - 2015	Not released
Cap coverage	40% of the city's total emissions: 543 companies (600 entities are expected) from heat supply, power generation, cement, petrochemical, car manufacturing, and public buildings	40% of Total Emissions covered: 242 companies, 6 sectors: electro-plated aluminum, metal alloy, calcium carbide, caustic soda, cement, steel & iron	55% of the province's total energy consumption: 211 firms are listed (power, cement, steel, ceramics, petrochemical, non-ferrous, plastics, paper)	35% of the province's total carbon emissions. 138 entities are listed (steel, chemical, cement, automobile manufacturing, power generation, non-ferrous metals, glass, paper and etc.)	57% of the city's total emissions: 190 entities are listed (steel, petrochemical, chemical, non-ferrous metal, power, building materials, textile, paper, rubber and chemical fiber industry)	38% of the city's total emissions: 832 entities listed from 26 sectors which cover various forms of industry in addition to power, gas and water supply; Participation open to any financial institution. 197 public use buildings	60% of the city's total emissions: 114 entities Iron and steel, chemicals, electricity, heat, petrochemical, oil and gas mining, civil construction
Other sectors	Transport, Airport and banks	-	in discussion to cover transportation, textile and building	-	Airlines, ports, airports, railways, large commercial shops, hotels and banks	in discussion to cover public transport and taxis	-
Baseline years	2009, 2010, 2011	From 2008 to 2012	2011, 2012	2010, 2011	2009, 2010, 2011	2009, 2010, 2011	From 2009 to 2013

	Beijing	Chongqing	Guangdong	Hubei	Shanghai	Shenzhen	Tianjin
Allocation methods	*Free allocation* in 2013 based on 2009-2011 emissions levels. 2014 and 2015 allowances allocated before May each year, based on verified emissions of previous year. *Auction*: a small amount will be auctioned *Carbon market adjustment reserve*: up to 5% of annual allocation. Reserve is used to adjust price between ¥20-150.	*Free allocation* based on grandfathering	*Free allocation* of 97% in 2013, 97% for industries and 95% for power in 2014 and 90% in 2015. *Auctioning* is used as a complementary method (2014 compliance floor price is ¥25 for the first auction of the year, climbing to ¥40 for the final one) *Reserves*: 1. for new entrance 2. For adjustment.	*Free allocation* of 92% before May 30 each year. *Reserve*: 8% of annual allocation. Only 3% of this reserve can be auctionned (floor price ¥20)	One-off and *free allocation* for 2013-2015 based on 2009-2011 considering emissions growth. Benchmarking used for sectors when conditions allow. *Auctioning* is used as a complementary method only to fulfill compliance obligation (2014 price floor: ¥46)	One-off and free allocation for 2013-2015. 2014 and 2015 allowances to be allocated based on production capacity of the previous year. *Auctioning* used as a complementary method only to fulfill compliance obligation (2014 price floor: ¥35.4) *Reserve for new entrance* (2% of total allowances) and *market adjustment reserv* e (2% of total allowances)	*Free allocation* of allowances each year with possible adjustment. *Auctioning* will be used
Borrowing and banking		No borrowing, banking is allowed during pilot period Only spot trading allowed		No borrowing, banking is allowed during pilot period	No borrowing. Banking is allowed during pilot period	No borrowing. Banking is allowed during pilot period	No borrowing, banking is allowed: banked 2013-2015 quotas can be used for compliance until May 31, 2016
MRV	Build enterprise emissions inventory. Yearly emission report. 3rd party verified required to DRC in March	Firms with standard coal consumption + 8,000 tons per year must complete MRV procedures. 3rd party verification required.	Emissions Audits. 3rd party verification required.	Firms with standard coal consumption + 8,000 tons per year must complete MRV procedures. Yearly emission report. 3rd party verification required	Emissions Audits. Yearly emission report. 3rd party verification required	Yearly emission report. 3rd party verification required. Not allowed to use the same verification agency for 3 years in a row	Build enterprise emissions inventory and investigation systems. Yearly emission report. 3rd party verification required. Not allowed to use the same verification agency for 3 years in a row

	Beijing	Chongqing	Guangdong	Hubei	Shanghai	Shenzhen	Tianjin
Offsets	5% of annual allocations can be met with CCERs or other projects assessed and certified by NDRC. At least 50% of the offsets should be generated within the jurisdiction of the city of Beijing Exclusion: projects generating HFCs, PFCs, N2O, SF6 and hydropower projects	8% of annual allocations can be met with CCERs. only from Chongqing and projects entered into operation after Dec.31, 2010. Exclusion: hydropower projects	10% of annual allocations can be met with CCERs. At least 70% have to come from projects within the province and at least 50% from CO_2 or CH_4 reduction projects Exclusion: hydropower projects, pre-CDM projects and projects of power generation, heat supply or waste energy recovery whose emission reduction caused by the use of coal, oil or gas	10% of annual allocations can be met with CCERs. only from Hubei	5% of annual allocations can be met with CCERs.	10% of annual allocations can be met with CCERs.	10% of annual allocations can be met with CCERs.
Penalties	Non-Compliance: every missing allowance has to be paid for at 3 to 5 times the market price of the last six months Not submitting reports: rectification and up to ¥50,000	Non-Compliance: 3 x average market price of the last month before the compliance deadline Not submitting report: ¥20-50,000	Non-Compliance: 3 x average market price (up to ¥50,000)and have twice the level of the over emissions deducted for the next year allowances Not submitting report : ¥10-30,000 Resisting verification: ¥10-50,000 non-publishing information and non-implementing risk management system: ¥10-50,000	Non-Compliance: 3 x average market price (up to ¥150,000), have twice the level of the over emissions deducted for the next year allowances and administrative penalty Not submitting reports: ¥10-30,000 Resisting verification: halve following year's allocation Fraud: halve following year's allocation	Non-Compliance: ¥50-100,000 Not submitting reports: ¥10-30,000 Resisting verification: ¥30-50,000	Non-Compliance: 3 x average market price of last six months' price and deduction of the insufficient portion from the following year's allocation Not submitting verification report: ¥10-50,000 (for error or overdue) or ¥50-100,000 (for serious circumstances) Fraud: fines for insufficient portion 3x average market price of last six months' price	Not submitting report: loss Governmental Funds in 3 years.
Registry and Exchange	Beijing Environment Exchange	Chongqing Carbon Emission Exchange	Guangdong Emission Exchange	Hubei Carbon Emission Exchange	Shanghai Environment and Energy Exchange	Shenzhen Emission Exchange	Tianjin Emission Exchange
Linking	Launched an inter-regional cooperation for carbon emission trading pilot with Changde City - Hebei Province (December 2014). Plan to link with Tianjin, timing TBD	Not specified	Plan to link with pilot ETS in Hubei Province	Plan to link with pilot ETS in Guangdong Province	willingness to develop a régional carbon ETS with the surrounding cities in the Yangtze River Delta (essentially focused on capacity building and the perspective is not clear).	Willingness to build a régional ETS, signed a MoU with Huain (November 2014) and Baotou (December 2014)	Plan to link with Beijing and Hebei, timing TBD

SECOND STEP: IMPLEMENTING A NATIONAL ETS

At the end of 2014, the NDRC released a document on the *Provisional measures for the administration of carbon emission rights trading*[34] outlining basic guidelines on the framework and design of a national ETS but does not include technical specificities.[35] In February 2015, the NDRC supplemented the document with a notice covering a national market plan framework accompanied by a timeline for its execution. [36] While the State Council is currently working on high-level ordinances on the national ETS, it is likely that China's FYP13 (2016-21) will include references to the National ETS Plan which is expected to be published in 2016.

NDRC national ETS implementation roadmap

The NDRC divides the development of a national ETS in three periods:[37]

- ***The preparation phase (2014–15)***: During this phase the State Council plans to establish the design and conditions of the ETS, as well as finalizing the national system by:
  - Issuing supporting details and technical standards;
  - Determining GHG accounting methods and standards for all covered sectors;
  - Defining the national ETS features;
  - Completing the national registry.

- ***The operational improvement phase (2016-20):*** This phase is divided into two stages:
  - First Stage (2016-17): This period will begin with a test run where all the regulations pertaining to the national ETS will enter into force. During this time, the first allowances will be distributed and market operations will commence whereby all 33 Chinese provinces and other regions will be expected to blend policies with the national system.
  - Second Stage (2017-20): At this stage the ETS will be fully implemented and adjusted to enhance market stability.

- ***The stabilization and maturation phase – beyond 2020***: The objective of this stage will be to increase the number of trading products in order to further stabilize the national ETS and to enable the enhancement of market capacity and the exploration of linking with other existing ETS's.

The NDRC's National ETS Guidelines: A Summary

This section is based on the December 2014 Provisional measures notice and on the February 2015 notice. The Provisional measures notice was divided in seven chapters.

- ***Chapter 1 on general provisions*** asserts that the State Council will be responsible for establishing and issuing regulations as well as enforcing compliance. Emissions trading will be established at the provincial level as well as in autonomous regions and cities. Allowance distribution and adjustments to their respective emission caps will be determined by the provinces and regions themselves. The scope of the national program is expected to gradually establish terms that will cover CO_2, CH_4, HFC's, PFC's, SF_6, and NFC.[38] There is potential for the inclusion of sectorial coverage for Co_2 produced by the power sector, metallurgy, building materials and other key industries (detailed in the February notice).
- ***Chapter 2 covers the cap, allowance distribution and management:*** the State Council will set a national emissions cap which will then be broken down into a provincial cap based on historical emissions[39] for each of the 33 provinces and administrative regions.[40]. Allowances will be distributed using free allocation which will decrease over time to incorporate the auctioning of allowances. [41] The auctioning proceeds will be used to promote national carbon emission reduction and capacity building[42]. The State Council will determine the allowance allocation system based on the specific circumstances of the covered sectors, emission data and international competitiveness among other factors. All allocation plans must be approved by the State Council

before they are sent to the provinces and regions.[43] However provinces, autonomous regions and municipalities may implement allowance distribution methodologies featuring more stringent measure than the nationally prescribed standards[44]

- ***Chapter 3 – Emissions trading:*** Allowances, early allowances and CCERs are available for entities to use as compliance tools in the National ETS with the prospect of integrating other products over time.[45] The State Council will establish "regulatory mechanisms" to maintain market stability[46] and a national registry will maintain records of all transactions undertaken by covered entities.[47] NDRC will select the qualified exchanges that will serve as the national exchanges.[48]
- ***Chapter 4 – Monitoring, Reporting and Verification system:*** the State Council will be responsible for releasing the national accounting and reporting standards for GHG emissions and for establishing verification procedures.[49] The State Council will design templates for monitoring plans which Provinces and regions will be able to adapt to meet local conditions. Covered enterprises should surrender allowances to local DRC annually as their obligation which will be reported to the NDRC by the local DRCs.[50]
- ***Chapter 5 – Supervision and administration:*** The State Council will be responsible for enforcing a 'verification mechanism' as well as a 'trading mechanism' in addition to managing compliance.[51] Nevertheless, the NDRC will be the national authority for the management of the national ETS, and the local Development and Reform Commissions (DRC) will be responsible for the surveillance of their respective ETSs and system monitoring and reporting systems.[52]
- ***Chapter 6 – Non-compliance and legal liability:*** non-compliance, not-submitting reports, resisting verification or fraud will be subject to penalties. Verification firms can also be found in non-compliance if they submit false or misleading verification reports. Civil servants in the provinces/regions can also be subject to punishment if they abuse privileges or share emissions for example.
- ***Chapter 7 – Supplementary provisions:*** This section sets all the definitions and outlines for equating emissions insofar as one tonne of GHG emissions, measured in CO_2 equivalent, will be equal to one Chinese Emissions Unit or Chinese CER.

The February 2015 notice also offers guidelines to improve capacity building, technical support and training. In addition, the notice also highlights that the establishment of a national ETS has to be integrated within national or regional economic and social development plans. Complementary policies such as fiscal or financial supporting policies must be improved for greater harmonization.

Defining the national emission cap

While the national ETS framework provides a glimpse into the overall potential and functionality of the system, there are several important elements with regards to setting ***a national emissions cap*** that have yet to be fully explored and communicated officially.

As it does for scope, NDRC considers cap-setting an important element for an eventual national ETS, and both an absolute cap and an intensity-based cap are under consideration. When comparing the two, NDRC states:

"*Each of them has its own pros and cons. But generally, the absolute cap is more favorable for controlling a system's cap when an economy is on a climbing trajectory, but it increases the abatement cost. The intensity target helps control the cost when an economy is booming, and address some problems like over-allocation and price collapse when the economy is waning. The majority of economists prefer an absolute cap. Because if the cap [were] framed in intensity terms, there would be uncertainty in the market about the number of permits available until after the GDP data for that year had been published.*" [53]

While further study is needed, in 2013, NDRC identified three possible options for cap-setting:

1. Separate the national target into an ETS portion and a non-ETS portion, then directly allocate emission allowances to enterprises/installations at the national level.
2. Disaggregate the national GHG target into targets for local governments. Local governments then divide their targets into an ETS portion and a non-ETS portion. The targets for ETS portions of local-level targets accumulate to form the national ETS cap.
3. The national government determines ETS inclusion criteria and allocation methodology, but gives local governments some degree of flexibility.

Accounting and market infrastructure

In order to ensure the smooth implementation of ETS in China, the NDRC intends to develop a comprehensive and coordinated market oversight system. Key steps include:

- Designating a competent authority to take charge of the daily operation and management of the ETS. Following the December 2014 and the February 2015 notices, it seems that the State Council will be responsible for the national ETS regulations and the provinces or regions' administrations and carbon emissions exchanges will be in charge of the daily operation and management of the sub-national systems.
- Establishing a coordination mechanism among government agencies to avoid overlap of functions.

In parallel to the development of national ETS rules, the NDRC has to set a plan for the development of GHG emission control mechanisms and launch a national registry.

MRV system development

On 27 November 2014, the national carbon emissions management standardization technical committee issued a notice on the GHG emissions accounting methods and reporting guidelines.[54] These guidelines were submitted to public comments until 20 December 2014. If approved by the State Council, the guidelines would serve as a solid foundation on which to implement a national ETS. The notice includes national standards for power generation companies, power grid companies, magnesium manufacture, civil aviation and for several industries (steel, chemical, aluminum, glass, cement and ceramic). The guidelines were built on the 2013 guidelines for accounting and reporting GHG emissions for ten industries.

To continue the carbon emission reduction policy, in November 2014, the NDRC unveiled a draft notice for public comment on 10 national GHG emissions accounting methods and reporting guidelines.[55]

Already four GHG accounting methods and reporting guidelines have been approved: oil production, petrochemical industry, coal mining and coking industry. Eight others are in development: building, transportation, paper-making, non-ferrous metal, food, ferrous metal, large machine manufacture and commonly-used guidelines[56]. They all find their roots in the NDRC's Notice on carbon emissions trading pilot (October 2011).[57]

National Registry

With regard to registries, the goal is that national and local registries ensure smooth transfers and use resources efficiently. Analyses of the relations between national and local registries shall include: (1) determining whether local registries need to establish independent registries; (2) if local areas will require registries, clarify the positioning and functions of registries at both national and local levels; and (3) if local registries are not needed, identify the functions of relevant local organizations in the operation of the national registry.

The design and the construction of the national registry have been already accomplished. The registry was tested and NDRC launched the national registry for offsets (CCERs) trading in January 14th 2015[58]. The start of the national registry is planned to have two stages: [59]

- First stage: opening the registry for CCERs users (January 2015).
- Second stage: improving the registry in order to establish a carbon emissions trading registry.

COMPLEMENTARY POLICY MEASURES

Other types of carbon markets active in China

- **Voluntary emissions trading**

Beijing, Shanghai, and Tianjin set up emissions trading exchanges in 2008. Since then, voluntary emissions trading has arisen in China, and an array of technical standards and financial channels have been established. A voluntary carbon standard, called the "Panda Standard", was introduced in 2009, by the China Beijing Environment Exchange and focuses on LULUCF projects. The only registered project applying the Panda Standard to date was for a total amount of 45,631 tCO2 in reductions. Of that amount, 16,800 tCO2 was purchased by a real estate company in April 2011. However, there is no publicly available information of the details of the transaction to date.[60]

In June 2012, NDRC released the *Interim Regulation for the Trading of China's Voluntary GHG Emission Reduction*[61]. This regulation established a national level framework for voluntary carbon market trading, including a trading process framework, a regulation framework, and a technology supporting system.

The national framework includes the Kyoto Protocol's six GHGs and the issued credits are named "*Chinese Certified Voluntary Emission Reduction*" (CCERs) which originate as a result of emissions reductions, that have been certified by a national body appointed by the NDRC.

Two types of projects may apply for the CCER certification:

- Projects developed using the Clean Development Mechanism (CDM): methodology defined by the United Nation's. The government maintains incentive for the development of CDM projects by allowing credits to be issued to projects not registered with the UNFCCC;
- Projects developed using a NDRC methodology.

The goal of such a framework is to standardize voluntary emissions reductions transactions and improve enterprises' incentives to participate. In October 2012, NDRC released *Guidelines on Validation and Certification of Voluntary Greenhouse Gas Emission Reduction Projects*. This document specifies and clarifies technical and non-technical requirements for validation and certification. In January 2013, five eligible Trading Platforms were approved (Beijing, Tianjin, Shanghai, Guangzhou and Shenzhen). Thereafter between March 2013 to May 2014, the NDRC further approved 178 methodologies[62]. Nine entities have been accredited to be the Validation and Verification Entities, all of which are the domestic organizations. Although the international players have operated their business in China for decades, none of them has got the ticket to this market

- **International market: CDM cooperation**

Since 2005, China has been the world's foremost developer of CDM projects. As of March 2015, the Chinese government had approved 3,941 CDM projects, 3,762 of which had been successfully registered after the CDM Executive Board's approval. The estimated annual emissions reductions average from Chinese CDM projects is close to 630 million tonnes of CO_2 equivalent. China accounts for 49.51% of total CDM projects emitted since 2008[63].

Host country	Total number of CDM projects	Host country share / Total CDM projects (%)	Total issuance of CERs (kCERs)	Host country share/ Total issuance (%)
China	3 762	49,51%	1 435	52,26%

Table 6: Registered Chinese CDM projects in March 2015

Source: CDM, http://www.cdmpipeline.org/publications/CDMPipeline.xlsm

Other environmental policies

In addition to the ETS pilots, to reduce GHG emissions, the government has worked consistently to promote low carbon pilot projects in selected provinces and cities, which began in 2013. As a result of these *Low carbon city development programs* such as the aforementioned ETS pilots, pilot demonstration projects in low carbon transport and industrial parks, a vast network of low carbon projects have emerged across the nation. The various projects have made positive progress in the implementation and development of clean energy strategies, increasing forest sinks, promoting a green lifestyle as well as incentivizing low carbon consumption. Projects have also led to increased innovation allowing for the continued development of mechanisms and approaches that aid in the achievement of national and local climate targets.

Air quality - In January 2014, China's provinces, municipalities and autonomous region set air pollutants emission reduction target of 5 to 25% to address air quality which has become one of China's most pressing social and environmental challenges. In March 2014, the State Council pledged that 60% of Chinese cities would meet national air quality standards in 2020. In September 2014, the State Council released a *review of the Air Pollution Law,* which aims to tighten the regulation on major air pollutants. The proposed plan requires the implementation of a monitoring and an early-warning system for high concentration of air pollution, a cap on coal consumption and other main air pollutants, non-compliance penalties, and the requirement to establish local contingency plans. The reviewed Air Pollution law was submitted to the National People Congress Standing Committee in December 2014 for approval.

In recent years, the Chinese government has supported increased usage of ***renewable energy*** and implemented actions to improve ***energy efficiency***. According to the *12th Five-Year Plan for Renewable Energy Development*, the total consumption of renewable energy in 2010 represented 8.9% of the country's overall primary energy consumption mix.

On May 2014, the NDRC, the Ministry of Environmental Protection and the Energy Bureau jointly released *the Working plan for air pollution control in the energy sector* which intends to cut fossil fuel dependency, reduce carbon emissions and increase the share of energy consumption from renewable energy sources. The working plan includes twenty-six articles, each pertaining to one aspect of energy actions. Several objectives are set for 2015 and 2017 for the share of fossil fuel, natural gas, and renewable sources within the total energy consumption. The plan calls for the cleaner use of coal through the promotion of clean-coal transformation techniques and further research on energy storage technology to reduce coal reliance to 65% of total energy consumption.

Objective	2015	2017
Non fossil fuel*	11.4%	13%
Hydro power	290 gigawatts	330 gigawatts
Wind power	100 gigawatts	150 gigawatts
Solar power	35 gigawatts	70 gigawatts
Biomass power	50 million tonnes of standard carbon	70 million tons of standard carbon

* Percentage of national energy consumption

Table 7 – Renewable Energy Targets by sources for 2015 and 2017

Source: *NDRC, http://www.sdpc.gov.cn/zcfb/zcfbtz/201405/W020140516377906113358.pdf, May 2014*

The State Council issued the *Action plan for energy saving, emission reduction and low carbon development for 2014-2015* on May 2014. The objective of the plan is to reduce CO2 emissions per unit of GDP by4% in 2014 and by an additional 3.5% in 2015[64].

This plan was followed by the *Energy development strategy action plan* unveiled by the State Council in November 2014 which details the following 2020 targets;

- Annual primary energy consumption is to be capped at 4.8 billion tonnes of standard coal equivalent; meaning that energy usage is limited to grow by only 3.5% a year until 2020.
- Coal consumption will be capped around 4.2 billion tonnes a year by 2020 (16.7% more than the 2013 primary energy consumption).
- Share of non-fossil fuels will rise to 15% a year in the national energy mix by 2020.

In September 2014, the Renewable energy attractiveness Index created by Ernst & Young placed China at first place in terms of attractiveness for RES investment and deployment opportunities[65].

Also pertaining to energy, China has established a domestic trading system for "*power generation rights*" that are issued by provincial governments. According to NDRC, "*in principle, the generation rights trading is to replace inefficient and pollution intensive thermal power generation with efficient and environment-friendly units, such as clean energy generation units including hydroelectric power and nuclear power plants*." This market for "power generation rights" originated in the Sichuan Province in 1999, and has expanded to additional provinces. In 2011, the traded electricity exceeded 107.5 billion kWh, meaning 8.3 million tce was saved and 21.90 million tonnes of CO_2 equivalent was reduced.

China is also initiating the *Renewable Power Certificate system* aiming to set the minimal share of the installed capacity and of the power generation from the renewable sources. Hydropower is not accounted in the system. The power producers will be allowed to purchase the renewable certificates from others when their renewable capacity or the renewable power generation can not reach the targets set by the central government. The draft Guideline has been submitted to State Council in January 2015 after a wide-scale stakeholder consultation.

Historically, China has relied on a variety of mechanisms to achieve environmental goals. For example, at the beginning of 2006, the Chinese government set relatively high feed-in tariffs for renewable energy. Since 2010, taxes on oil and gas resources have increased, and a cap of 4.2 billion tons on coal productions by 2020 was introduced in 2015. To date, major policy instruments have not involved explicit carbon prices, but many of the top-down measures, such as the feed-in tariff for wind, have introduced implicit carbon prices.[66]

CARBON MARKETS WITH CHINESE CHARACTERISTICS

1. No other ETS in the world has built itself from the bottom up using provincial- and city-scale pilot systems.
2. As the largest developing country in the world, the scale at which China grapples with environmental sustainability and implementing an emissions trading system as its economy develops is unparalleled.
3. A carbon intensity reduction target is very specific and allows for continued economic growth, while addressing energy consumption and emissions growth.

CHALLENGES

1. *Learning lessons from the experimentation phase* – China started its policy on emission trading through a period of experimentation in order to learn lessons through experience and to facilitate the development of an ETS at national-. One question may be how the outcomes from the seven ETS pilots would deeply determine the nature and shape of the national system.
2. *Double counting issues* – Within ETS pilots, the covered CO_2 comes from direct emissions (Scope 1) and indirect emissions (Scope 2). Covered energy producers have an obligation to surrender allowances for their generated CO_2 emissions due to the electricity production. In the same time, covered companies purchasing electricity from these energy producers also have to surrender allowances for their Scope 2 emissions. In this situation, CO_2 emissions are counted twice. According to Caspar Chiquet[1], "*this kind of double counting does not harm the effectiveness of the tool in reducing emissions, as long as it is accounted for in the cap setting: the cap should indeed consider more than the total emissions covered as some are counted twice*".[67] It is unknown how ETS pilots took into account the double counting for the cap setting. However, Caspar Chiquet assumes that "*provinces and municipalities have procedures for dealing with such double counting issues, since the same questions arise for the energy intensity reporting and accounting under the Five-year plans*".[68] The same question can be asked for the national ETS, if its gases coverage would include Scope 1 and Scope 2 emissions.
3. *The transition from the 7 ETS pilots to a national ETS* – In view of recent information it remains unclear how the transition of the seven pilot ETS programs will merge with the national system. During the transition between pilots and national ETS, possible difficulties may arise during the process: the harmonization of the national registry with the ETS pilots' registries, the potential carry over the next period of unused allowances in the pilots' ETSs. NDRC is enhancing the communication between pilots and the national ETS to assure a "smooth transition" due to the fact that all pilot regions are willing to keep their own pilot autonomy. NDRC is looking for a solution that will merge ETS pilots' willingness to keep their own characteristics and the need to have a harmonized national ETS.[69]
4. *Cost pass-through questions* – due to the fact that China's electricity sector is heavily regulated, carbon ETS costs cannot be easily passed on to consumers, which may be a cause of market distortions. [70] In order to establish an efficient carbon emission system, the Chinese government may need to undertake deeper reforms such as a liberalization of the power sector to avoid an economic backlash. According to Caspar Chiquet, an "*alternative would be to turn the current intensity targets into an absolute cap on energy consumption. With such a cap*[71]*, it would be easier to implement local and national cap-and-trade systems than under the current intensity target*".[72]

[1] Caspar Chiquet is the Head of Implementation for the Advisory Unit and manages the MRV practice of South Pole.

Author Acknowledgements:

If you have any comments or suggestions for this case study, please do not hesitate to contact the lead authors:

CDC Climat Research co-author: Marion Afriat (marion.afriat@cdcclimat.com)

IETA co-author: Jeff Swartz (swartz@ieta.org)

CDC Contact: Emilie Alberola (emilie.alberola@cdcclimat.com)

IETA Contact: Katie Kouchakji (kouchakji@ieta.org)

CDC Climat Research
47 rue de la Victoire 75009 Paris, France

International Emission Trading Association
Rue de la loi 235, Brussels, Belgium

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[72] CHIQUET Caspar, Accounting for Carbon, Chapter 8 – variant 4: emissions of a company – the case of the Shenzhen ETS, Cambridge University Press.