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CENTER FOR CLIMATE CHANGE LAW

**RED CHINA GOING GREEN: THE  
EMERGENCE AND CURRENT  
DEVELOPMENT OF CARBON EMISSIONS  
TRADING IN THE WORLD'S LARGEST  
CARBON EMITTER**

by  
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June 2013

Columbia Law School Working Paper  
Center for Climate Change Law  
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June 2013

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## I. Introduction

China is undergoing industrialization and modernization at a scale and speed the world has never witnessed before. Since its economic reform in 1978, China has experienced more than three decades of exceptional economic growth, at a rate three times faster than the world average.<sup>1</sup> The country is currently the world's second largest economy after the United States and the largest exporter of goods.<sup>2</sup>

However, accompanying China's astounding development is a whole host of environmental and sustainability problems. In the past fifty years, temperature has increased 0.26 and 0.18 °C per decade in eastern and western China, respectively, and sea level has risen 0.1-0.25 centimeters per year.<sup>3</sup> Internally, China's leaders are especially concerned about the impact of climate change on political stability, fearing that its failure to protect the environment might "someday serve as the catalyst for broad-based demands for political change."<sup>4</sup> Indeed, that someday may have already arrived. For instance, central and eastern China is currently choking on smog. Of 74 Chinese cities which started reporting levels of PM2.5, also known as fine particles, in the beginning of this year, 33 have taken readings of over 300 micrograms per cubic meter in the first two weeks.<sup>5</sup> The World Health Organization recommends 24-hour

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<sup>1</sup> Jianguo Liu & Peter H. Raven, *China's Environmental Challenges and Implications for the World*, 40 CRITICAL REVIEWS IN ENVIRONMENTAL SCIENCE AND TECHNOLOGY 823, 825 (2010).

<sup>2</sup> *World Economic Outlook: Hopes, Realities, and Risks*, INTERNATIONAL MONETARY FUND (April 2013), <http://www.imf.org/external/pubs/ft/weo/2013/01/index.htm>.

<sup>3</sup> Liu, *supra* note 1, at 823.

<sup>4</sup> Elizabeth C. Economy, *The Great Leap Backward?*, 86 FOREIGN AFFAIRS 38, 47 (September/October 2007); *see also* Jonathan B. Wiener, *Climate Change Policy and Policy Change in China*, 55 UCLA LAW REVIEW 1805 (2008).

<sup>5</sup> Nan Xu & Chun Zhang, *How Did China's Air Pollution Get This Bad?*, CHINADIALOGUE.COM (January 14, 2013).

exposure to PM2.5 levels of no higher than 25.<sup>6</sup> According to Chen Jiping, a former leading member of the Party's Committee of Political and Legislative Affairs, pollution has replaced land disputes as the main cause of social unrest in China.<sup>7</sup> Externally, China also faces ever mounting pressure from the international community to meaningfully combat climate change, especially after having surpassed the United States in 2009 (possibly earlier) to become the world's largest carbon emitter.<sup>8</sup>

This paper focuses on one of China's efforts to engage with climate change—the establishment and development of carbon emissions trading schemes (ETSs) in the country. Section II examines the shift from command and control approaches to market mechanisms in China's climate policy over the past two decades, which primed the domestic scene for the emergence of carbon emissions trading. Section III studies the seven regional ETS pilots due to launch later this year, the success or failure of which will to a large extent determine the future of carbon markets in not only China, but most likely the rest of the world. Finally, section IV discusses the barriers these pilot programs need to overcome, and provides some suggestions for China to move forward and achieve its goal of establishing a nationwide scheme by 2015-16.

## **II. China's Shift Towards a Market-Based Environmental Policy**

It is worth noting that the concept of emissions trading is not completely new in China. As early as 1990 the United States and China worked together on the feasibility of sulphur

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<sup>6</sup> Xin Zhou, *Chinese Anger Over Pollution Becomes Main Cause of Social Unrest*, BLOOMBERG NEWS (March 6, 2013).

<sup>7</sup> *Id.*

<sup>8</sup> See, e.g., Stian Reklef, *Global CO2 Emissions Rise 3 Percent in 2011*, REUTERS (July 19, 2012); see also Karl Hallding et al., *China's Climate- and Energy-Security Dilemma: Shaping a New Path of Economic Growth*, 38 JOURNAL OF CURRENT CHINESE AFFAIRS 119, 121-123 (2009).

trading within the country, culminating in a memorandum of understanding<sup>9</sup> and the completion of two phases of sulphur emission trading pilots in four provinces, nine cities, and one trans-regional Chinese power enterprise.<sup>10</sup> On the one hand, these pilot projects revealed many negative features of emissions trading in China: trading was based on “instructive price” instead of “market price”; allocation methods were highly variable and not transparent; no formal legal provision existed that directly governed the implementation of emissions trading; and the lack of a system of independent professional consultants and service providers such as auditors and brokers under the Chinese command and control approach has raised further questions of market integrity and efficiency.<sup>11</sup> On the other hand, these trading pilots have significantly contributed to building the foundation of emissions trading in China, most importantly by initiating an ideological change among stakeholders to recognize that they can no longer pollute at will, and that pollution costs may have to be internalized.<sup>12</sup>

China has also had some experience with the carbon market specifically, mostly through the Clean Development Mechanism (CDM) under the Kyoto Protocol. The CDM is an offset market in which developed countries obtain “carbon credits,” also known as certified emission credits (CERs), by implementing a project in a developing country that reduces domestic emissions relative to an agreed and verified baseline.<sup>13</sup> After endorsing the CDM in 2004, China

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<sup>9</sup> *Clean Air Market Partnerships – China*, EPA.GOV (2003), available at <http://www.epa.gov/airmarkt/international/china/index.html>.

<sup>10</sup> Julia Tao, *Between Market and State: Dilemmas of Environmental Governance in China's Sulphur Dioxide Emission Trading System*, 27 ENVIRONMENT AND PLANNING C: GOVERNMENT AND POLICY 175, 176 (2008).

<sup>11</sup> *Id.* at 180, 181. See also QIN TIANBAO, CLIMATE CHANGE AND EMISSION TRADING SYSTEMS (ETS): CHINA'S PERSPECTIVE AND INTERNATIONAL EXPERIENCES 57-71 (KAS-Schriftenreihe China, 2012).

<sup>12</sup> Tao, *supra* note 10, at 181.

<sup>13</sup> *About CDM*, UNFCCC WEBSITE, available at <http://cdm.unfccc.int/about/index.html>.

very quickly became the dominant CER supplier.<sup>14</sup> As of April 30, 2013, a total of 3,554 Chinese projects have been successfully registered with the CDM Executive Board, accounting for 52.6% of the world's total registered projects.<sup>15</sup> To better handle the deluge of CDM transactions, China started building domestic capacity and trading infrastructure that would eventually be able to manage robust carbon markets.<sup>16</sup> For example, the National Development and Reform Commission (NDRC) began calculating and publishing grid emission factors, an essential tool for establishing baseline emissions in any emissions trading scheme.<sup>17</sup> In addition, beginning in 2008 with the Tianjin Climate Exchange (TCX), China launched and is currently developing more than one hundred “climate exchanges,” “carbon exchanges,” or “environment exchanges,” all aiming to trade carbon in the future.<sup>18</sup> Though the CDM has its fair share of limitations and shortcomings, it further prepared China for the establishment of its own domestic carbon trading scheme.<sup>19</sup>

Despite these past experiments, China's interest in carbon trading as a means of realizing emissions reductions still might come as a surprise to many. With heavy government intervention, significant state ownership of enterprises and a culture of distrust in business, the country remains far from a true free-market economy.<sup>20</sup> As one source put it, “the idea that a

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<sup>14</sup> See, e.g., Zhongxiang Zhang, *China in the Transition to a Low-Carbon Economy*, EAST-WEST WORKING PAPERS, February 2010, at 17.

<sup>15</sup> CDM: CDM Insights, UNFCCC WEBSITE, available at <http://cdm.unfccc.int/Statistics/Public/CDMinsights/index.html>.

<sup>16</sup> RICHARD SCOTNEY ET AL., CARBON MARKETS AND CLIMATE POLICY IN CHINA: CHINA'S PURSUIT OF A CLEAN ENERGY FUTURE 8 (ClimateBridge, 2012)

<sup>17</sup> *Id.*

<sup>18</sup> GUOYI HAN ET AL., CHINA'S CARBON EMISSION TRADING: AN OVERVIEW OF CURRENT DEVELOPMENT 18 (Fores Study, 2012:1).

<sup>19</sup> See, e.g., Scotney, *supra* note 16, at 8.

<sup>20</sup> Qiang Wang, *China Has the Capacity to Lead in Carbon Trading*, 493 NATURE 273 (2013).

communist country would actively seek to implement market mechanisms seems unlikely.”<sup>21</sup> The country’s environmental policy, like most other development objectives laid down in China’s Five Year Plans (FYPs), has for decades been deeply entrenched in a command and control system.<sup>22</sup> Emission reduction targets are distributed down through the hierarchy from central to provincial to local levels, combined to a very limited extent with economic tools such as resource taxes, tax breaks, subsidies, and investment programs.<sup>23</sup> Thirty years of economic reform have increased the role of markets dramatically, yet corresponding reforms of administrative systems have been lagging behind, and in many ways there still remains “too much government and too little market.”<sup>24</sup> For example, the 11<sup>th</sup> FYP that was in place between 2006 and 2010 set a mandatory target to reduce energy intensity by 20% from 2005 levels.<sup>25</sup> China managed to achieve a 19.06% reduction by the end of the 11<sup>th</sup> FYP, but mostly through political intervention such as electricity rationing and enforced closure of inefficient power plants and factories.<sup>26</sup> The Chinese leadership soon realized that, aside from being unsustainable over the long term, such draconian top-down measures could result in uneven GDP and job loss within sectors and across provinces.<sup>27</sup> Consequently, officials and policymakers started placing more emphasis on market-based instruments to help achieve energy and carbon intensity targets

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<sup>21</sup> GEORGE YU & ROB ELSWORTH, TURNING THE TANKER: CHINA’S CHANGING ECONOMIC IMPERATIVES AND ITS TENTATIVE LOOK TO EMISSIONS TRADING 15 (Sandbag, April 2012).

<sup>22</sup> Wu Qian, *Policy and Politics of a Carbon Market in China*, GREENHOUSE GAS MARKET REPORT 2011, 22 (2011).

<sup>23</sup> Hallding, *supra* note 8, at 130.

<sup>24</sup> *Id.* at 131.

<sup>25</sup> *Id.* at 127.

<sup>26</sup> Qian, *supra* note 22, at 22.

<sup>27</sup> *Prospects for Carbon Trading in China*, THE CLIMATE GROUP POLICY BRIEFING 2 (2010).

in cost-effective ways. This is the context in which the Chinese government announced its intent to establish a national carbon trading system by 2015 in its 12<sup>th</sup> FYP (2011-2015).<sup>28</sup>

### III. The Seven Regional ETS Pilots

The central government has decided that NDRC's climate change department and its local affiliations will take the lead, and coordinate with other departments, to implement the ETS portion of the 12<sup>th</sup> FYP.<sup>29</sup> In April 2011, NDRC officials announced that pilot carbon trading markets will begin in selected cities and provinces, with the hope that actual trading will start as early as 2013.<sup>30</sup> In November of the same year, the State Council issued a "Workplan for Controlling Greenhouse Gas Emissions during the 12<sup>th</sup> FYP," in which the need to establish carbon trading schemes was highlighted.<sup>31</sup> Immediately following the release of the Workplan, in mid-November, NDRC officially approved carbon trading pilots in seven provinces and cities: Beijing, Guangdong, Tianjin, Shenzhen, Shanghai, Hubei, and Chongqing.<sup>32</sup> The seven pilot sites were selected to reflect the regional diversity in terms of economic activity and development, allowing China to test various emissions trading models and gather experience on a municipal and provincial level before any such scheme is scaled up to a national level.<sup>33</sup> It is forecasted that with these pilot programs up and running, China will regulate 800 million to 1

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<sup>28</sup> MARK FULTON, 12<sup>TH</sup> FIVE YEAR PLAN—CHINESE LEADERSHIP TOWARDS A LOW CARBON ECONOMY 1 (Deutsche Bank Group, 2011).

<sup>29</sup> Qian, *supra* note 22, at 23.

<sup>30</sup> *China Planning Emissions Trading in 6 Regions—Point Carbon*, Reuters (April 11, 2011), available at <http://www.reuters.com/article/2011/04/11/china-carbon-trading-idAFL3E7FB1Q320110411>.

<sup>31</sup> *Factbox: China's Carbon Market Plans*, Reuters (November 10, 2011), available at <http://www.reuters.com/article/2011/11/10/china-carbon-idAFL3E7L41ON20111110>.

<sup>32</sup> HAN, *supra* note 18, at 23.

<sup>33</sup> Rob Elsworth, *Trading Places?*, CHINADIALOGUE.COM (May 17, 2012).



billion metric tons of emissions by 2015, making it the world's second biggest cap-and-trade program after the EU ETS.<sup>34</sup>

In July 2012, NDRC released a new set of regulations entitled “The Interim Regulation of Voluntary Greenhouse Gases Emission Trading in China,” which set out a series of standards that regional governments must follow as they set up carbon trading schemes.<sup>35</sup> Specifically, the regulation applies to the trading activities of the following 6 GHGs: CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFCs, PFCs and SF<sub>6</sub>.<sup>36</sup> The new rules also promote a series of standardized methodologies “recorded by NDRC”<sup>37</sup> that cover how to “set up the baseline, to demonstrate the additionality, to calculate the emission reductions, to make the measurement plan, etc.”<sup>38</sup> It seems that they are largely modeled after CDM methodologies, and NDRC has employed experts to ensure that they suit the needs of Chinese voluntary trading schemes.<sup>39</sup> Another noteworthy provision in the Interim Regulation details how all emission reductions delivered through voluntary carbon markets must be recorded by NDRC and independently validated by qualified validation organizations that have been approved by the Commission.<sup>40</sup> Finally, the Interim Regulation introduced the China Certified Emissions Reduction (CCER) mechanism, which provides qualified offset credits to the domestic carbon market.<sup>41</sup>

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<sup>34</sup> *China Zone Sets Date for Carbon Trading Start*, THE SYDNEY MORNING HERALD (April 5, 2013).

<sup>35</sup> James Murray, *New Regulations Lay Groundwork for Chinese Carbon Market*, BUSINESSGREEN.COM (July 10, 2012).

<sup>36</sup> The Interim Regulation of Voluntary Greenhouse Gases Emission Trading in China, § 2 (2012) [hereinafter Interim Regulation].

<sup>37</sup> *Id.* § 9.

<sup>38</sup> *Id.* § 10.

<sup>39</sup> *See* Interim Regulation, § 10.

<sup>40</sup> *See* Interim Regulation, § 12.

<sup>41</sup> *See* Interim Regulation, § 21.

Under the guidance of these new regulations, all pilot programs are required to submit proposals explaining how carbon emissions targets will be allocated, establish a dedicated fund to support the carbon trade market, and present detailed implementation plans for approval by the State Council by the end of 2012.<sup>42</sup> The following subsections will look at the progress made so far in each of these pilot project regions.

### **Beijing**

From 2006 to 2010, Beijing has increased its energy efficiency by 26.59% from 2005 levels, making it the most energy-efficient region in the country.<sup>43</sup> It has achieved this mainly through the relocation of heavy industry, higher GDP contributions from a larger service industry, diversification of energy consumption patterns and the application of energy-efficient technology.<sup>44</sup> Under the 12<sup>th</sup> FYP period, the capital is assigned an ambitious target of a 17% increase in energy efficiency and an 18% reduction in carbon intensity.<sup>45</sup>

The Beijing municipal government released draft rules for its pilot carbon trading scheme on March 28, 2012, which contained details regarding the allocation of permits, use of offsets, and price control mechanisms.<sup>46</sup> According to the rules, more than 600 companies with direct and indirect carbon emission exceeding 10,000 tons per year will be included on a mandatory list for capping emissions.<sup>47</sup> It is so far unclear exactly which sectors are covered, but Point Carbon, a consulting firm that tracks and analyzes carbon markets, reported that thermal electricity

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<sup>42</sup> HAN, *supra* note 18, at 23.

<sup>43</sup> YU, *supra* note 21, at 16.

<sup>44</sup> *Id.*

<sup>45</sup> *Announcement on the Results of Each Region in Meeting the Energy Conservation Target During the 11<sup>th</sup> Five Year Plan*, NATIONAL BUREAU OF STATISTICS OF CHINA (2011), available at [http://www.stats.gov.cn/tjdt/zygg/gjtjjgg/t20110610\\_402731394.htm](http://www.stats.gov.cn/tjdt/zygg/gjtjjgg/t20110610_402731394.htm) (in Chinese).

<sup>46</sup> *Beijing Releases Draft Rules for Emissions Trading Scheme*, POINT CARBON (March 28, 2012). Point Carbon requires subscription to access this article, and it doesn't seem like the Beijing Draft Rules are publicly available yet.

<sup>47</sup> Lan Lan, *Beijing Preparing for Carbon Trading System*, CHINA DAILY (April 20, 2012).

providers, the heating sector, manufacturers and major public buildings have already been asked to provide emissions data for the period between 2009 and 2010.<sup>48</sup> Furthermore, the municipal government will offer a free quota on the amount of a pollutant that may be emitted by companies, although certain industry insiders have suggested leaving about 15% of the overall quota for auction, in an effort to build a market-oriented system.<sup>49</sup> The overall quota is yet undetermined, though it will be closely linked to the city's target of lowering its carbon intensity by 18% during the 12<sup>th</sup> FYP.<sup>50</sup>

Currently, Beijing has made it a top priority to figure out how to calculate the city's indirect carbon emissions, since about 70% of Beijing's electricity consumption is generated outside the capital.<sup>51</sup> Due to this peculiar feature, the city's carbon trading program is likely to have two layers: one for direct emissions targeting producers starting in 2013, and the other for indirect emissions targeting consumers, possibly to be implemented a year later.<sup>52</sup> In order to avoid double counting, the direct and indirect emissions markets may be kept as separately traded markets, with CCER produced by voluntary emission reduction trading activities available to be used as offsets in both markets.<sup>53</sup>

To be sure, there still remains a considerable amount of uncertainty surrounding what the Beijing carbon trading scheme might eventually look like and how it will work. Nevertheless, Beijing has a sophisticated and informed business community, and one of the leading

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<sup>48</sup> *China: Carbon Offset Market in Sight as Beijing Prepares for Pilot Carbon Trading From 2013*, GLOBAL GREEN POLICY INSIGHTS, June 1, 2012, at 14.

<sup>49</sup> Lan, *supra* note 47.

<sup>50</sup> *Id.*

<sup>51</sup> *Id.*

<sup>52</sup> *Id.*

<sup>53</sup> YU, *supra* note 21, at 17; *Beijing Launched Carbon Emission Trading Pilot Project and Planned to Compulsively Incorporate 600 Enterprises*, CAMBRIDGE FUNDS INVESTMENT (March 28, 2012).

environmental exchanges in the country—the China Beijing Environmental Exchange (CBEEEX), which has been proactive in advocating emission trading as a cost effective means of emissions mitigation.<sup>54</sup> Among other things, CBEEEX was involved in setting up the “Panda Standard,” which targets Agriculture, Forestry and Other Land Use (AFOLU) offset projects and generates carbon credits for the voluntary market.<sup>55</sup>

### **Guangdong Province**

Guangdong province is a manufacturing hub on China’s southern coast and a main thoroughfare to the Pearl River Delta region. It has the highest carbon emissions of any Chinese province—500 million tons of CO2 equivalent per year.<sup>56</sup> However, by phasing out or retrofitting less energy efficient heavy industry, developing energy consumption monitoring systems and mandating energy saving measures in the building and transportation sectors, it is the second most energy-efficient region in the country.<sup>57</sup> In the 12<sup>th</sup> FYP, the central government gave Guangdong provincial authorities a target to reduce its carbon intensity by 19.5% from 2005 levels by the end of 2015 and 45% from 2005 levels by the end of 2020.<sup>58</sup>

The Guangzhou Institute of Energy Conversion (GIEC) under the Chinese Academy of Sciences is in charge of the design and implementation of the Guangdong pilot ETS, while the Guangzhou Exchange Services Group (GESG) has been identified to work on the registry software design and trading platform, and eventually host trading.<sup>59</sup> In September 2012, the GIEC released a detailed draft plan for the Guangdong ETS, making Guangdong the first

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<sup>54</sup> YU, *supra* note 21, at 17

<sup>55</sup> *Id.*

<sup>56</sup> HAN, *supra* note 18, at 25.

<sup>57</sup> YU, *supra* note 21, at 18.

<sup>58</sup> HAN, *supra* note 18, at 25.

<sup>59</sup> *Id.*

province to issue ETS regulations.<sup>60</sup> According to the draft plan, the Guangdong ETS will cover nine industries that altogether account for nearly half of the province's power consumption—cement, steel, ceramics, petrochemicals, textiles, nonferrous metals, electricity, plastics and paper-making.<sup>61</sup> Other sectors, including transportation and construction, may be added to the scheme later.<sup>62</sup> Companies that emit more than 20,000 tons of CO<sub>2</sub> a year will be required to participate in the trading scheme, which amounts to 827 companies in the province.<sup>63</sup> In February of this year, the Development and Reform Commission (DRC) of Guangdong released its first list of specific companies required to either participate in emissions trading or to solely report their emissions.<sup>64</sup> This list includes 310 companies across four industrial sectors—electricity, cement, steel, and petrochemicals—47% of which are from the cement sector.<sup>65</sup> Like the EU ETS, these companies will initially be assigned a free quota of carbon credits to use or trade.<sup>66</sup> Furthermore, the draft plan lays out a three-phase timeline: a testing period in 2012-2015, an “improvement” period in 2016-2020, and finally full trading after 2020.<sup>67</sup> Furthermore, Lu Xiulu, Director of the Guangdong DRC, also confirmed an absolute cap of 660 million tons of CO<sub>2</sub> in 2015—the first quantified cap of any of the seven pilots.<sup>68</sup> As a point of comparison, the California cap-and-trade program has set a target cap of 334.2 million metric tons of CO<sub>2</sub>

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<sup>60</sup> Joshua Speckman, *Guangdong Steps Closer to Carbon Trading Launch*, ENVIRONMENTAL FINANCE (September 20, 2012).

<sup>61</sup> Danny Lee, *Guangdong Presses Ahead with Carbon Trading Pilot*, THENANFANG.COM (April 1, 2013).

<sup>62</sup> Leslie Hook, *China's Guangdong Unveils Ambitious Carbon Trading Scheme*, FINANCIAL TIMES (September 12, 2012).

<sup>63</sup> *Chinese Province Guangdong Launches Pilot ETS, Will Include 827 Enterprises*, CLIMATE CONNECT NEWS (September 11, 2012).

<sup>64</sup> *Guangdong Issues First List of Companies Covered Under Emissions Trading Scheme*, CLIMATE CONNECT NEWS (February 15, 2013).

<sup>65</sup> *Id.*

<sup>66</sup> Hook, *supra* note 62.

<sup>67</sup> *Id.*

<sup>68</sup> YU, *supra* note 21, at 18.

equivalent for 2020.<sup>69</sup> The Guangdong cap has most likely left room for emissions to grow in the coming years, and it will be important to know how allowances are to be allocated to better understand where the demand in the market will come from.<sup>70</sup>

Given that there is a certain degree of competition between the pilot regions, Guangdong has set a great example for its counterparts by releasing draft guidelines early, having industry participants on board, and setting ambitious goals, especially in light of the plan's inclusion of the electricity sector. Moreover, being one of two provinces in the pilot, Guangdong has a combination of a very poor western part, a developed economic powerhouse in the Pearl River Delta, and northern and eastern parts that are more typical of interior China with a mixture of agriculture and industry.<sup>71</sup> Jeff Swartz, the international policy director at the International Emissions Trading Association, has stated that “the Beijing, Shanghai, Tianjin [pilots] may...have nice programs, but nothing that looks like it can be implemented across the country, because those are cities. Guangdong mirrors all of China and therefore might be a very interesting place to test market mechanisms to reduce emissions.”<sup>72</sup> All signs point to the province's ambition, and perhaps ability, to build a more rigorous program than the other six regions, which could very well become the model for a national ETS in China.<sup>73</sup>

### **Tianjin**

As the second wealthiest city in the country, Tianjin was recognized for its excellent performance in achieving energy efficiency during the 11<sup>th</sup> FYP period, exceeding the assigned

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<sup>69</sup> *California Cap and Trade*, CENTER FOR CLIMATE AND ENERGY SOLUTIONS, available at [www.c2es.org/us-states-regions/key-legislation/california-cap-trade#Details](http://www.c2es.org/us-states-regions/key-legislation/california-cap-trade#Details) (last accessed May 1, 2013).

<sup>70</sup> *Id.*

<sup>71</sup> Speckman, *supra* note 60.

<sup>72</sup> *Id.*

<sup>73</sup> HAN, *supra* note 18, at 29.

target by 1%.<sup>74</sup> With challenging targets of energy efficiency increase of 18% and carbon intensity reduction by 17% lying ahead for the 12<sup>th</sup> FYP, Tianjin continues to improve the energy efficiency of the city and decouple economic growth from carbon intensive power production.<sup>75</sup>

As previously mentioned, the Tianjin Climate Exchange (TCX) was established as early as 2008 under the partnership between Petro China, the Chicago Climate Exchange, and the Tianjin Property Rights Exchange.<sup>76</sup> Over the years, TCX has gained valuable experience in the trading of various emissions rights, including GHGs and major pollutants such as sulphur dioxide and COD.<sup>77</sup> In December 2011, the Asian Development Bank (ADB) approved a grant of \$750,000 for designing the Tianjin ETS, which has attracted both international and domestic experts to develop the scheme, from preparation to implementation.<sup>78</sup> The ADB grant also included a timeline: obtain approval of feasibility study for the Tianjin ETS by NDRC and the Tianjin Municipal Government by December 2012, complete the prerequisites for the initiation of the Tianjin ETS by June 2013, and launch the Tianjin ETS by December 2013.<sup>79</sup> Tianjin's draft ETS rules governing the period from 2013 to 2015 were released on April 8 of this year, which covers about 635 companies that have emitted over 20,000 tons of CO<sub>2</sub> in any year since 2009.<sup>80</sup> The sectors included in the Tianjin ETS are steel, chemicals, electricity, heat, petrochemical, oil and gas, mining, and construction.<sup>81</sup> The cap will be determined annually for

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<sup>74</sup> YU, *supra* note 21, at 19.

<sup>75</sup> *Id.*

<sup>76</sup> *Id.*

<sup>77</sup> *Id.*

<sup>78</sup> *ADB to Fund Tianjin ETS Design*, Point Carbon (November 23, 2011).

<sup>79</sup> YU, *supra* note 21, at 20.

<sup>80</sup> Robert Hansor, *News About Tianjin's Draft ETS Rules and Shenzhen's Carbon Trading Start Date*, CLEANER HORIZONS (April 8, 2013).

<sup>81</sup> *Id.*

each of the three years, although the exact start date for trading is not yet known.<sup>82</sup> Participants in the Tianjin ETS may use CCERs, but for no more than 10% of their annual emissions.<sup>83</sup> It was also reported that there is no ban on using credits from outside the borders of Tianjin, which could open the door to CER trading, possibly analogous to those now traded in the EU ETS.<sup>84</sup> Ultimately the hope is that Tianjin’s pilot ETS will “provide valuable lessons for the design of a nationwide system to reduce the carbon intensity of the Chinese economy.”<sup>85</sup>

### **Shenzhen**

As China’s first—and one of the most successful—Special Economic Zones (SEZs), Shenzhen, situated in Guangdong province, operates at the sub-provincial division level, and has the same power as any provincial capital city in terms of policy making in economics and law.<sup>86</sup> Shenzhen was assigned an energy efficiency increase target of 7.84% and a carbon intensity reduction target of 15% under the 12<sup>th</sup> FYP.<sup>87</sup>

In April of this year, Shenzhen’s mayor Qin Xu announced that its ETS pilot will start trading on June 17, 2013, the first precise start date among the country’s regional carbon trading schemes.<sup>88</sup> The Shenzhen ETS will initially include 638 companies, which discharged 31.7 million tons of GHGs in 2010, representing 38% of the city’s total.<sup>89</sup> The scheme will eventually expand to include transportation, manufacturing and construction companies.<sup>90</sup> However, no

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<sup>82</sup> *Id.*

<sup>83</sup> *Id.*

<sup>84</sup> *Id.*

<sup>85</sup> YU, *supra* note 21, at 19.

<sup>86</sup> *Id.* at 21.

<sup>87</sup> NATIONAL BUREAU OF STATISTICS OF CHINA, *supra* note 45.

<sup>88</sup> Esther Tanquintic-Misa, *China’s Shenzhen Sets June 17 as Start of Carbon Emissions Trading*, IBTIMES.COM (April 5, 2013).

<sup>89</sup> Jonathan Kaiman, *China Unveils Details of Pilot Carbon-Trading Programme*, GUARDIAN.CO.UK (May 22, 2013).

<sup>90</sup> *Id.*



information has been made publicly available regarding other aspects of the scheme such as the overall cap or allocation methods.

### **Shanghai**

China's financial center Shanghai, following in Shenzhen's footsteps, has announced that it will launch its ETS this June, though no specific date was set.<sup>91</sup> Manufacturers of steel, petrochemicals and electricity with annual carbon emissions of at least 20,000 tons are included in the Shanghai ETS, involving about 200 companies in 16 industries that dispensed 110 million tons of carbon dioxide annually.<sup>92</sup> The list includes China's state-owned oil companies PetroChina and Sinopec, as well as companies in the aviation sector, such as China Eastern Airlines and Shanghai Airlines.<sup>93</sup> Detailed guidelines for monitoring, reporting and verification (MRV) have been issued for aviation, electricity, steel manufacturing, non-ferrous metals, textile, paper and non-metallic mineral production sectors.<sup>94</sup> The Shanghai Environment Energy Exchange (SEEEEX), recently restructured as a limited corporation where State Grid and the China Clean Development Mechanism Fund are amongst the shareholders, has been identified as the trading center to implement the scheme.<sup>95</sup>

### **Hubei Province**

Home to the famous Three Gorges Dams, Hubei province was specially mentioned by the National Bureau of Statistics of China as having done an outstanding job in exceeding its energy

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<sup>91</sup> *Shanghai Joins Shenzhen in Announcing Start of Carbon Trade*, CLEANBIZ.ASIA (April 11, 2013).

<sup>92</sup> *Id.*

<sup>93</sup> *Id.*; *Shanghai Includes Airlines in Carbon Trading Scheme, Issues MRV Guidelines*, CLIMATE CONNECT NEWS (January 9, 2012).

<sup>94</sup> CLIMATE CONNECT NEWS, *supra* note 92.

<sup>95</sup> YU, *supra* note 21, at 20.

efficiency target by 1.67% during the 11<sup>th</sup> FYP.<sup>96</sup> For the ensuing five-year period, Hubei was assigned an energy efficiency target of 16% and a carbon intensity reduction target of 17% from 2010 levels.<sup>97</sup>

Hubei's pilot ETS, set to launch in the second half of 2013, will cover about 150 companies across eight sectors, regulating around 35% of the province's total emissions.<sup>98</sup> These companies will be given free permits, and CCER offset credits are allowed to meet up to 15% of their cap.<sup>99</sup> The Hubei government will set aside 15% of the total amount of permits it will hand out in a reserve for new facilities that may come online after the ETS has started, but the newcomers may only use CCERs to meet 10% of their targets.<sup>100</sup> Unlike in Tianjin, the use of offsets generated outside Hubei's borders are prohibited, which means the companies cannot use CERs.<sup>101</sup> An interesting detail included in the draft rules for Hubei's ETS is that offsets from tree planting are preferred.<sup>102</sup> This reflects the legacy and represents a continuation of the forestry carbon sink project that has been in place within the province since 2008.<sup>103</sup>

### **Chongqing**

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<sup>96</sup> NATIONAL BUREAU OF STATISTICS OF CHINA, *supra* note 45.

<sup>97</sup> *Id.*

<sup>98</sup> *China's Hubei to Cap CO2 from One-third of Economy*, CARBON EQUITIES (June 9, 2012); *Hubei to Start Carbon Trading Scheme in the Second Half of 2013*, CLIMATE CONNECT NEWS (February 22, 2013).

<sup>99</sup> CARBON EQUITIES, *supra* note 97.

<sup>100</sup> *Id.*

<sup>101</sup> Robert Hansor, *Details of Hubei's Pilot Carbon Market Emerging*, CLEANER HORIZONS (March 5, 2013).

<sup>102</sup> *Id.*

<sup>103</sup> Guodong Du, *China Launches Carbon Sequestration Project in Hubei Province*, XINHUANET.COM (March 11, 2008).

Alongside Beijing, Shanghai, and Tianjin, Chongqing is one of China's four direct-controlled municipalities, located inland in the southwest.<sup>104</sup> The Chongqing DRC has asked the Chongqing United Assets and Equity Exchange to set up a trading platform and provide trading software.<sup>105</sup> The Chongqing ETS is expected to launch later this year, covering six industrial sectors—electrolytic aluminum, ferroalloy, calcium carbide, caustic soda, cement, and iron and steel.<sup>106</sup> The DRC is also in the process of launching a statistical system to determine the baseline carbon emissions of the entities covered which will then be used for allocation of emission allowances.<sup>107</sup>

### **Inter-Provincial Collaboration**

As can be seen, each of the seven regional carbon trading schemes offers something unique, a result of the province or city tailoring policies to suit its own circumstances. Indeed, one of the advantages of developing a range of pilots is that different approaches can be tested to see which will work in a Chinese context. That being said, it would be unusual if the designers of the various schemes did not collaborate to some extent, as they will all be facing similar challenges and may benefit greatly from sharing their ideas.<sup>108</sup> The prize for early collaboration might be that pilot schemes can be linked together creating a larger, more liquid market in the long term.<sup>109</sup> Intentions to link schemes have been touched upon in a White Paper published by the State Council Information Office, reporting on the government's intentions to gradually

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<sup>104</sup> *Geography of China's Municipalities*, available at <http://geography.about.com/od/chinamaps/tp/china-municipalities.htm>.

<sup>105</sup> *Chongqing to Launch Carbon Trading This Year*, CLIMATE CONNECT NEWS (January 30, 2013).

<sup>106</sup> *Id.*

<sup>107</sup> *Id.*

<sup>108</sup> YU, *supra* note 21, at 21.

<sup>109</sup> *Id.*

establish trans-provincial and trans-regional ETSs.<sup>110</sup> Authorities in Guangdong and Hubei, the only two provinces among the seven pilot programs, have already expressed interest in cross-provincial trading to potentially start in 2014.<sup>111</sup>

### **Hopes for a National ETS and a Global Carbon Market**

As mentioned at the end of Section II, the central government has expressed a desire to set up a national ETS by the end of the 12<sup>th</sup> FYP period, hopefully through the successful implementation and linking of the seven regional pilots. Indeed, according to a recent speech given by NDRC's deputy chair Xie Zhenhua, China is considering introducing a target to cap its overall carbon emissions as early as 2016 in its 13<sup>th</sup> FYP (2016-2020), though no final decision has been made.<sup>112</sup> NDRC is also actively looking at 2025 as the year in which China will hit peak carbon emissions, while previous predictions have all hovered around 2030 and beyond.<sup>113</sup> Though some observers and policy researchers prefer to be more conservative about the pace of change in China, the Chinese government's determination to "take a low-carbon path" is unmistakable,<sup>114</sup> and a very real possibility exists that someday, various municipal, provincial and regional trading schemes will be combined into a nationwide system.

Moreover, there is little doubt that China would have an eye on the future potential integration with other existing international carbon trading systems such as the EU ETS, or other regional ones in the Asian Pacific rim, such as in Japan and Australia.<sup>115</sup> The World Bank estimates that carbon trading globally could be worth \$3.5 trillion by 2020, meaning it would

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<sup>110</sup> *Id.*

<sup>111</sup> *Id.*; HAN, *supra* note 18, at 24; Qian, *supra* note 22, at 25.

<sup>112</sup> Leslie Hook, *China Eyes Cap on Carbon Emissions by 2016*, FINANCIAL TIMES (May 27, 2013).

<sup>113</sup> Nan Xu, *Chinese Whispers on Carbon Emissions Cap Do Little to Help Climate Change*, CHINADIALOGUE.COM (May 30, 2013).

<sup>114</sup> *Id.*

<sup>115</sup> HAN, *supra* note 18, at 52.

overtake oil to become the world's largest market.<sup>116</sup> If China does manage to establish a functional national ETS, it would be far and away the largest carbon emissions trading scheme in the world, thereby providing the basis for the emergence of a global carbon market.<sup>117</sup>

#### **IV. Challenges Ahead and Possible Solutions**

Even though future prospects for carbon trading in China seems incredibly promising, it is important to keep in mind that currently, all seven pilot carbon emissions trading schemes are still in their infancy. There remain many stumbling blocks, some particular to China, others shared by carbon trading schemes worldwide, which must be overcome before a meaningful national scheme can be implemented. Some of the main challenges and their possible solutions are explored individually in the subsections that follow.

##### **Emissions Cap: Absolute or Intensity-Based?**

The departure point for any emissions trading scheme, no matter the size or scope, is setting an emissions cap. The current state of the EU ETS is a warning to all that a cap set at an inappropriate level would cause it to function ineffectively.<sup>118</sup> Aside from determining a specific number, a perhaps more important question for China is whether the cap should be absolute or intensity-based. An absolute carbon cap has the advantage of making emission reductions predictable by fixing reductions up front.<sup>119</sup> On the other hand, a carbon intensity cap, while reducing environmental certainty, is less controversial within China because it is seen as more

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<sup>116</sup> Tao Wang, *China's Carbon Market Challenge*, CHINADIALOGUE.COM (May 21, 2012).

<sup>117</sup> See *supra* note 34 and accompanying text. See also, MIRIAM SCHRODER, THE ROAD TOWARDS CHINA'S INTEGRATION INTO AN INTERNATIONAL EMISSIONS TRADING SYSTEM (GPPi Policy Paper, March 2011).

<sup>118</sup> See, e.g., Sam Fankhauser, *Carbon Trading: A Good Idea is Going Through a Bad Patch*, THE EUROPEAN FINANCIAL REVIEW 33 (April-May 2011).

<sup>119</sup> HAN, *supra* note 18, at 44.

compatible with the needs for continued GDP growth.<sup>120</sup> Though there is not yet a consensus within the country, several Chinese officials have surprisingly spoken up for the necessity of setting an absolute cap.<sup>121</sup> Moreover, in an article published in *Qiushi*—the Chinese Communist Party flagship magazine—an influential government think tank recognized that an absolute cap is fundamental, stating that “it is only under an absolute emissions cap that carbon emission permits will become a scarce resource and possess the qualities of a commodity.”<sup>122</sup>

As previously discussed in this paper, so far all targets contained in the FYPs have been efficiency- and intensity-based, though Guangdong has set an absolute cap of 660 million tons of CO<sub>2</sub> in 2015, in line with its 12<sup>th</sup> FYP target to reduce carbon intensity by 19.5%.<sup>123</sup> A key question in converting intensity or efficiency targets into an absolute number of tons is what assumptions to include about the likely economic growth over the period and also the expected trends in energy production and consumption.<sup>124</sup> It has been suggested that one way to protect the market from a higher or lower than expected growth rate is to set a portion of the emissions allowance to one side to be released into the market only if certain conditions are met.<sup>125</sup> There has been talk about including such a design in the Beijing ETS,<sup>126</sup> which will make the setting of the cap easier to get right since it allows for adjustments to supply to be made in a clear and transparent manner.<sup>127</sup>

### **Monitoring, Reporting, and Verification (MRV)**

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<sup>120</sup> *Id.*

<sup>121</sup> *See, e.g.,* Jing Li, *China to Impose Carbon Caps*, CHINA DAILY (August 4, 2011). *See also* *China Studying Regional CO<sub>2</sub> Caps*, REUTERS (August 18, 2011).

<sup>122</sup> Qian, *supra* note 22, at 24.

<sup>123</sup> *See supra* notes 45, 58, 68, 74, 86, 95 and accompanying text.

<sup>124</sup> YU, *supra* note 21, at 23.

<sup>125</sup> *Id.*

<sup>126</sup> *See supra* note 49 and accompanying text.

<sup>127</sup> YU, *supra* note 21, at 23.

To ensure that an emissions trading scheme runs smoothly, all market participants must have confidence that what they are trading is genuine, which in turn places a high degree of importance on MRV. The lack of reliable carbon emissions data makes it difficult to set a realistic cap, creating the risk that emission limits will be set either too high or too low.<sup>128</sup> Although most provinces and cities in China have energy-saving supervision centers which oversee the reporting of energy use statistics by high-consuming companies, businesses do not usually itemize their data.<sup>129</sup> And since energy audits are still uncommon, data verification proves extremely hard to carry out.<sup>130</sup> In the words of an official working on the Tianjin ETS, “top-down calculations and bottom-up calculations don’t match up. Neither do the figures from industry associations and those from emission in inventories.”<sup>131</sup> For example, last year, scientists compared Chinese CO<sub>2</sub> emissions as calculated using bottom-up data from the 30 provincial statistics bureaus.<sup>132</sup> For 2010, the bottom-up figure was larger by an amount equivalent to the total annual CO<sub>2</sub> emissions of Japan, about 5% of the global total.<sup>133</sup> Without accurate numbers, the first deal of the Guangdong trading scheme was based on expected future carbon emissions, rather than historical data.<sup>134</sup>

The country needs to develop and enforce proper legislation and regulations to measure, report, and verify carbon emissions from industrial sites. It needs to build an effective and accountable regulatory framework to oversee the reporting and trading of carbon credits. Most

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<sup>128</sup> HAN, *supra* note 18, at 42.

<sup>129</sup> Shuang Liu & Nan Xu, *Data Gaps Hobble Carbon Trading*, CHINADIALOGUE.COM (August 9, 2012).

<sup>130</sup> *Id.*

<sup>131</sup> *Id.*

<sup>132</sup> Wang, *supra* note 20.

<sup>133</sup> *Id.*

<sup>134</sup> *Id.*; *China’s Carbon Trading Debut Defies Doubters*, THE SYDNEY MORNING HERALD (October 12, 2012).

urgently, China needs to look at how it collects and analyzes data on carbon emissions in order to establish (or more optimistically, re-establish) credibility.<sup>135</sup> China should make data relating to emissions and submissions of allowances open to the public so that third parties and competitors can assist in checking for irregularities and detecting fraud.<sup>136</sup>

Admittedly, some infrastructure does exist in the country for measuring pollution such as sulphur oxides and energy consumption, including a handful of designated third-party verification companies determined by NDRC.<sup>137</sup> Realizing that this is woefully insufficient to support the implementation of a carbon trading scheme, China has recently started developing the MRV framework. In October 2010, China said at the fourth round of the UN climate talks in Tianjin that it is working on an up-to-date, national greenhouse emission database, the first publicly available database to include provincial level data since 1994.<sup>138</sup> Moreover, NDRC has made it a priority to improve GHG emissions data at the provincial level by training professionals in verification and registry creation.<sup>139</sup>

### **Which Sectors?**

Another area to consider is which economic sectors to include in a carbon emissions trading scheme. It is important to take into account the future growth rate of any given sector—more than half of the Chinese pilot programs are covering cement and steel, because the growth rates of these sectors would start to decline in the near future, and they are therefore less controversial.<sup>140</sup> Some are also concerned with carbon leakage,<sup>141</sup> which is defined as the

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<sup>135</sup> Wang, *supra* note 20.

<sup>136</sup> YU, *supra* note 21, at 25.

<sup>137</sup> HAN, *supra* note 18, at 43.

<sup>138</sup> THE CLIMATE GROUP POLICY BRIEFING, *supra* note 27, at 3.

<sup>139</sup> Qian, *supra* note 22, at 25.

<sup>140</sup> *Id.* at 24.



increase in emissions outside a region as a direct result of the policy to cap emission in this region.<sup>142</sup> In a system that begins only with regional coverage, it is sensible to start with sectors which do not compete for business with operators in uncapped regions, or sectors that are less mobile.<sup>143</sup> It does not appear that the issue of carbon leakage has been addressed or even mentioned in any of the draft plans released by the regional pilots.

Some Chinese ETS studies have suggested that energy intensive sectors and large emitters, such as the electricity sector, should be incorporated into trading programs first.<sup>144</sup> According to the Energy Research Institute (ERI), two of China's top five power companies (Datang and Guodian) have started piloting GHG emissions measurement and reporting in preparation for future trading.<sup>145</sup> However, carbon trading involving the electricity sector raises a problem specific to China: the wholesale and retail prices of electricity are currently set by NDRC, which is good for reliability but would limit the ability of a power plant to absorb a carbon price by passing on higher costs to customers.<sup>146</sup> Carbon trading in this sector may place an unduly taxing burden on Chinese power companies, especially given that some of them are already operating at a loss due to rises in energy commodity prices without corresponding increases to the electricity price.<sup>147</sup> Some have advocated for a reform in the electricity pricing system in China so that power plants have the flexibility to purchase electricity at varied price

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<sup>141</sup> See, e.g., Benjamin Haas, *Shenzhen Exchange Prepares for Backlash as Carbon Trading Starts*, BLOOMBERG (January 29, 2013).

<sup>142</sup> JULIA REINAUD, CLIMATE POLICY AND CARBON LEAKAGE 2 (International Energy Agency, 2008).

<sup>143</sup> YU, *supra* note 21, at 24.

<sup>144</sup> Qian, *supra* note 22, at 24. Note that the electricity sector is currently China's biggest carbon emitter.

<sup>145</sup> *Id.*

<sup>146</sup> THE CLIMATE GROUP POLICY BRIEFING, *supra* note 27, at 2.

<sup>147</sup> HAN, *supra* note 18, at 31.

levels.<sup>148</sup> Others have suggested that price regulation should be adjusted to reflect the new costs of carbon that will be included in the production of electricity.<sup>149</sup> Since the exact price of carbon in trading cannot be known in advance, the regulator will need to predict what level of increase to allow.<sup>150</sup> This calls for design features in the trading pilots which help to regulate price by adjusting the supply of allowances into the market.<sup>151</sup> For example, if a fixed volume of allowances are set aside and only released into the market if prices reach a certain level, then the regulator has a better idea of what the maximum price will reach in the market and what the increase should be.<sup>152</sup>

### **Emissions Allowance Allocation**

In a Chinese context, how should emissions allowances be efficiently and fairly distributed, on both provincial and firm levels? With different economic structures and growth rates, substantial difference exists in energy consumption and carbon emissions across Chinese provinces.<sup>153</sup> For example, in 2008, the province with the highest GDP (Guangdong) had a carbon intensity six times higher than the province with the lowest GDP (Tibet).<sup>154</sup> Given the wide economy and emission intensity discrepancy of Chinese provinces, allocating emissions rights will be far from straightforward. On an individual business level, the pilot locations expressed concerns about the lack of a uniform methodology for making allocations among

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<sup>148</sup> *Id.* at 46.

<sup>149</sup> YU, *supra* note 21, at 25.

<sup>150</sup> *Id.*

<sup>151</sup> *Id.*

<sup>152</sup> *Id.*

<sup>153</sup> HAN, *supra* note 18, at 41.

<sup>154</sup> *Id.*

firms.<sup>155</sup> An excessively simple approach could penalize firms that are already performing well by creating a situation where firms with historically high emission levels get higher quotas, while their more energy-efficient counterparts are given less room for maneuver.<sup>156</sup> Some researchers have suggested using the benchmark system applied in the EU ETS, where quotas are allocated according to a company's energy efficiency, but this requires a lot of basic data on company-level emissions, which again highlights how critical it is to solve the MRV problem in China.<sup>157</sup>

There are of course other critical issues begging to be addressed: China currently lacks a robust system of supporting legislation that provides for adjudication of inevitable carbon trading disputes, along with regulatory and auditing bodies vested with clearly defined powers that allow them to enforce said legislation and resolve issues promptly.<sup>158</sup> China is also toying with the idea of a carbon tax, which would provide a fixed price for the period during which a mature and nationwide carbon market develops.<sup>159</sup> Alternatively, during these early stages of setting up carbon trading schemes, it might be advisable to impose a price floor and ceiling to prevent economic or other uncertain factors from seriously affecting the carbon market.<sup>160</sup> Further research should also be done on the feasibility of tethering sulphur, nitrogen and particulate pollution—especially PM2.5 pollution—to carbon emissions rights, adding to the value of carbon trading and further reducing pollution.<sup>161</sup> More generally, there is widespread uncertainty about whether a carbon-trading scheme—meant to be a strong market-based instrument—can

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<sup>155</sup> Coco Liu, *7 Chinese Pilot Programs Make Final Preparations for Emissions Trading*, E&E NEWS (September 24, 2012).

<sup>156</sup> *Id.*

<sup>157</sup> *Id.*

<sup>158</sup> Alvin Lin & Fuqiang Yang, *Design Tips for a Carbon Market*, CHINADIALOGUE.COM (March 8, 2012).

<sup>159</sup> *Id.*

<sup>160</sup> *Id.*

<sup>161</sup> *Id.*

function well without a fully-developed, mature free-market economy.<sup>162</sup> All of the above-mentioned concerns and issues would have profound implications on the operation of a carbon market in China, even with good rules and design.

Support and advice from international communities with expertise is not only welcome but also critical to the success of China's fledgling carbon emissions trading schemes. Specifically, lawyers from the U.S. and Europe could advise corporate executives and financiers in China on how to effectively manage an emissions portfolio, considering that the latter possess no such practical knowledge since the government sets all the prices.<sup>163</sup> Moreover, GHG trading experts from abroad should provide insight into design choices that could profoundly impact linkability of these individual schemes, bearing in mind the desirability of eventually linking a Chinese national carbon market with other international systems.<sup>164</sup> Finally, financial support such as the ADB grant mentioned in the Tianjin ETS subsection would always be helpful in attracting legal experts within the country to design trading rules and regulatory framework.

## **V. Conclusion**

China has embarked on a sincere and ambitious journey to use emissions trading as one means of reducing its carbon emissions and realizing "green growth." The factors driving China's determination are two-fold. Internally, the Chinese authorities are acutely aware that environmental pressures can overflow into social unrest and political catastrophe, and therefore any future growth must be done in a sustainable manner. Furthermore, an understanding is taking root within the country that market-based mechanisms can combine high levels of ambition with sufficient flexibility to allow regulated sectors to adapt and innovate, thereby

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<sup>162</sup> HAN, *supra* note 18, at 52.

<sup>163</sup> *Id.* at xxiii.

<sup>164</sup> *Id.* at 29.

reducing cost and increasing the efficiency of China's efforts to reach carbon and energy intensity goals.<sup>165</sup> Externally, as climate change increasingly dominates the global agenda, countries such as the United States have been pointing to China's soaring emissions as a reason to drag their feet and hold back on ambition.<sup>166</sup> Similarly, countries such as Japan and South Korea are hesitant to move forward unilaterally for fear that their international competitiveness will be undermined.<sup>167</sup> As this paper hopefully illustrates, China is very serious in its efforts to redirect its economy onto a low carbon pathway. Having already made great strides in this area by forming a national directive and tentative timeline and initiating regional pilots, the coming five years will be an intensive period of experimentation with carbon trading schemes. The hope is that a carbon trading system will be economically advantageous compared to the administrative methods used in the 11<sup>th</sup> FYP. Despite the myriad barriers and challenges confronting it along the way, China's genuine resolve and the "crossing the river by feeling the stones" spirit will serve it remarkably well in establishing its own unique kind of carbon market that would transform its economy into a global low carbon leader.

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<sup>165</sup> YU, *supra* note 21, at 28.

<sup>166</sup> See, e.g., Dominique Bachelet, *Let's Clean House Before Pointing the Finger*, CONSERVATION BIOLOGY INSTITUTE (January 6, 2010).

<sup>167</sup> YU, *supra* note 21, at 28.