EMISSIONS TRADING IN CHINA
AN UPDATE

Back in 2011, I wrote an article for the IFP School alumni magazine about my on-going emissions trading work in China. That country had been extremely successful in generating carbon credits under the Kyoto Protocol – at one point capturing 84% of that market – and was at the time considering establishing its own domestic emissions markets to tackle its considerable pollution concerns.

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Today, of course, the world looks very different. China has now introduced seven pilot projects (in two provinces and five cities; and an eighth, if one counts the recent start-up in Fujian Province), and the country is planning to introduce a national carbon market later this year. That national market (which will begin with electricity, cement and electrolytic aluminum industries) should ultimately become twice as large as the EU's emissions trading system (EU ETS).

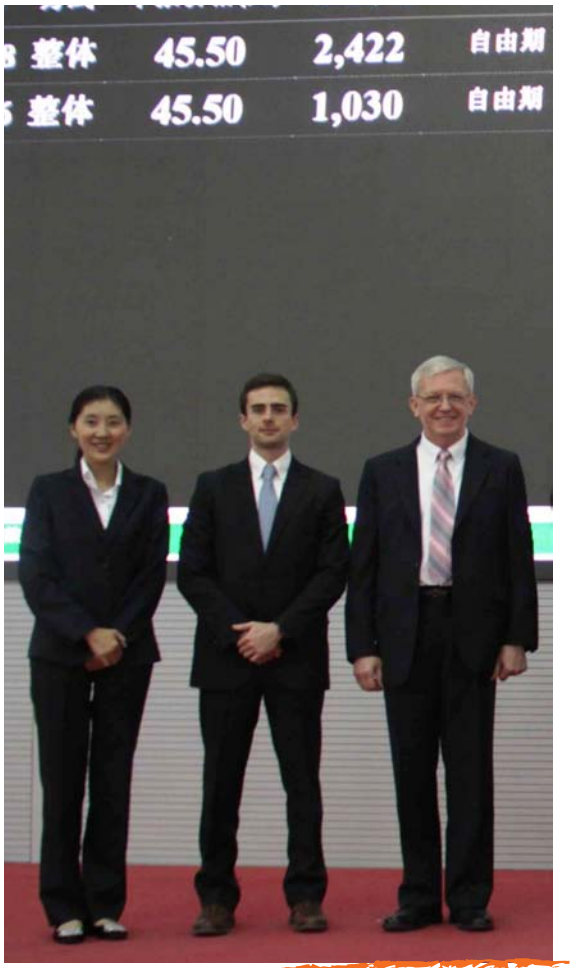
Given that China is the world's largest greenhouse gas emitter (emitting approximately twice as much as the second country, the United States) and that the carbon market will have comprehensive coverage in sectors addressing almost half of China's emissions, this represents the single-most important greenhouse gas control program in the world.

But I am often asked: Why did China choose such a path? Why emissions trading? Surely it would have been more comfortable with regulatory approaches

such as a carbon tax, or further reliance on 'command/control' regulations already evident within its centralized governance system?

The Shift to Markets

China obviously had considerable experience with command/control regulation, but it had also learned the limits of that model for environmental protection. Efforts to improve its energy efficiency with command models near the end of the 11th Five Year plan had led to company shutdowns in order to meet energy targets – thereby having a serious impact on the country's economic development. As part of its transition to a 'socialist market economy,' the country clearly wanted to harness market forces to accomplish these goals.



Professor Raufer (right) visiting the China Beijing Environment Exchange (CBEEX), accompanied by Ms. TAO Lan, Pollutant Rights Trading Center Director at CBEEX, and Mr. Filippo Feoli, a visiting legal scholar.

Economists offer two alternatives to command/control for pollution abatement efforts, relying either on a price mechanism (i.e., pollution taxes) or a quantity mechanism (e.g. emissions trading). The choice between these mechanisms on the efficiency front is quite complicated, depending upon a range of pollutant, scientific and technical concerns which are obviously discussed in our IFP School classes. But the political economy elements of the decision tend to swamp the efficiency concerns – and I believe that China's choice in this regard offers insight into both its economic culture and its views of the future:

- China first established emissions trading exchanges in 2008 in Beijing, Shanghai and Tianjin, at the height of its success under the Clean Development Mechanism of the Kyoto Protocol. It was during that year that China captured 84% of the market in carbon credits, and the country was selling most of its credits to Europe (while at the same time constructing more than 250 GW of new coal-fired power plants since the start of the EU ETS). These new quantity-based ideas were an eye-opening experience for both Chinese corporations and government officials.

- Important state-owned enterprises (SOEs) noted that the Chicago Climate Exchange had started off as a voluntary exchange in Chicago in 2003 with only $1.1 million in foundation funding – but several years later, that same organization had built up a multi-exchange company with a market cap of nearly $1 billion. If such a company could arise in a non-Kyoto-Protocol-participating country like the U.S. – imagine the opportunities within China!

- These same SOEs no doubt also took note of the fact that major utilities in the EU ETS were capturing 'windfall profits' associated with the grandfathering of EU emission allowances

(i.e., getting the allowances for free, but charging their customers at the market rate). Some SOEs therefore played an important role (including an ownership role) in establishing the new Chinese exchanges.

- Not surprisingly, an important – and no doubt very, very fierce – battle played out behind closed doors in China's highest reaches of government. The powerful National Development and Reform Commission (NDRC), aligned with the SOEs and seeking to control China's carbon future, fought with the Ministry of Finance (MOF) which obviously wanted the huge governmental revenues associated with any carbon tax. This battle can be glimpsed in Chinese media reports over several years, with MOF draft proposals constantly being swatted down by NDRC (and the lead national climate change officials working under its purview).

- One key price-versus-quantity consideration, however, lies in the future. China's quantity-based emissions market could ultimately link internationally with other countries, while a price-based carbon tax would be solely a domestic affair. It thus seems very likely that China is playing a longer-term (and perhaps mercantilist?) game – and laying the foundation for a world two or three decades from now, when the impacts of climate change are ever more threatening, and its carbon-based economy plays an increasingly dominant role in world economic affairs.

Indeed, the points above only hint at China's new enthusiasm for environmental markets. In September 2015, the State Council and the Communist Party's Central Committee introduced an *Integrated Reform Plan for Promoting Ecological Progress* calling for a "market system which allows economic levers to play a greater role in environmental governance." China has already been experimenting with SO_2 and chemical oxygen demand (COD) trading in eleven provinces over recent years, and established extensive eco-compensation schemes for forests, wetlands, grasslands and river basins throughout the country.

It is now experimenting and moving forward with market-oriented 'energy consumption quotas' for companies in four provinces this year, and introducing a (voluntary) renewable energy green certificate market this coming July – all in addition to its upcoming national carbon trading market. In fact, some are now wondering if this market enthusiasm represents a case of "too much, too soon" – especially given the country's noticeable lack of success in its early SO_2 and COD trading efforts, and similar problems and concerns evident in its on-going CO_2 pilots.

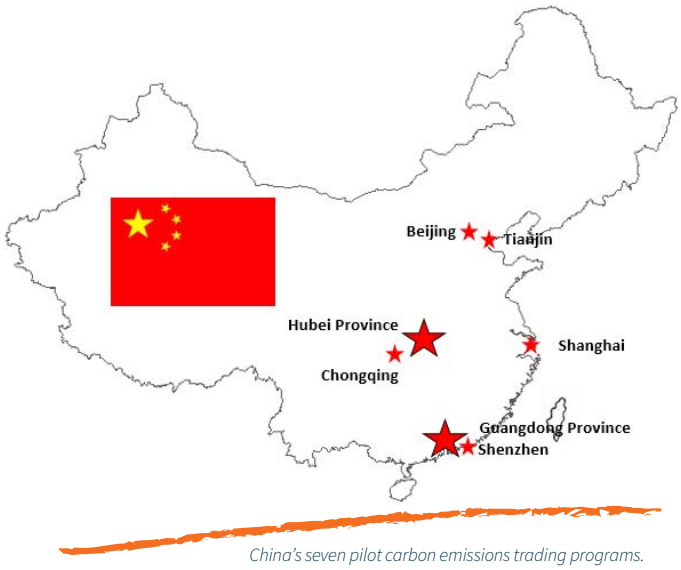
Monitoring, reporting and verification

In order to make such markets work, it is necessary to have strong monitoring (some use the term 'measurement'), reporting and verification (MRV) protocols and operations in place – and much of my work has focused on how China could use new information-based technologies to strengthen this effort.

I admit that I received more than a bit of teasing, since China is definitely not the most 'information-friendly' country, and routinely limits access to data it considers 'sensitive' – which covers a significant fraction of its energy and environmental information. My attempts to use information technology and 'big data' approaches for pollution control and emissions data were certainly met with considerable skepticism, and my initial plans to set up a Hong Kong-based company to provide such real-time services in China came to naught (despite considerable interest by both potential investors and clients).

At the Copenhagen COP conference, China made clear that only international funding would enjoy international MRV – and that any domestic programs would rely solely on domestic MRV efforts, which

in the SO_2 trading displayed considerable problems. China's SO_2 pilots were extremely reluctant to allow independent third-party verifiers to play any significant role. They usually chose government-related research institutes for this task, viewing the work as a revenue-generation source, and ensuring local governmental control of information. The resulting programs were often characterized in academic reviews by terms such as "pseudo-market" and "administrative-led," with MRV lagging well behind the introduction of new programs; and the carbon pilots have displayed many of these same characteristics.



China's seven pilot carbon emissions trading programs.

The *China-France Joint Declaration*, issued when China's Xi Jinping met with François Hollande shortly before the Paris COP in November 2015, did call for "an enhanced transparency system" but China clearly has a long way to go. As the Asian Development Bank-funded SO_2 trading project in Taiyuan noted: "Rome wasn't built in a day!"

Still, China is making efforts in this area. The NDRC has certified third-party verifiers for the national credit program, and China is increasingly using high-technology approaches to tackle its severe pollution problems. It has retained IBM to combine real-time air quality, meteorological and optical sensing data in order to provide a street-level understanding – and predictive capacity – of its serious air quality concerns in Beijing, and I've visited Microsoft's information lab in that same city which has similar efforts underway (targeted at a worldwide market).

Similarly, the technological support efforts that can make such approaches readily available and viable have also significantly changed over recent years. For example, I've been working with IFP Training in a number of instructional programs in General Electric's Florence Learning Center in Italy over recent years. In September 2015, GE introduced its 'Predix' platform – an approach which allows facilities to send control room information to the 'cloud,' a system which supports the development of predictive emissions monitoring systems (PEMS).

Future efforts

There's certainly a lot of exciting work being done now in China – as anyone who follows renewable energy or emissions trading or electric vehicles knows very well! I'm now living full-time in China – but also keep in touch with IFPEN personnel during both my Paris visits and elsewhere.

For example, the Hopkins-Nanjing Center where I teach is one of three campuses that are a part of Johns Hopkins University's School of Advanced International Studies (SAIS). There are two other SAIS campuses, in Washington DC and Bologna, Italy – and I was not at all surprised to learn that one of my former IFP School students is now a Professor at the Bologna campus. Professor Manfred Hafner similarly teaches in the ERE program – and we both teach a 'Global Energy Fundamentals" course that has been strongly influenced by our time at the IFP School.

We both look forward to continuing its important mission over future years!