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China's National Carbon Market: Paradox and Potential

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Overview

China announced it would launch a national carbon market in 2017, yet this policy is taking years to come into effect. What will it take for a carbon market to work in command-and-control China? This policy brief explores an understudied challenge—emissions accounting—and identifies potential opportunities that have arisen in the first phase of China's national carbon market.

Main Findings:

In early designs, China's carbon market was going to cover 14 sectors, but successive planning documents from 2016 to today have shrunk the number to eight, then three, and now one: the electric power sector. The electric power sector poses a major challenge for the design and efficacy of the carbon market policy due to the highly regulated nature of China's power markets.

The main challenges to accurate emissions accounting, even in just one sector, are overcoming a history of discrepancy in national-level verus provincial-level reporting, a lack of standardization across diverse companies and provinces with different levels of economic development, and the need for a legal foundation to support verification efforts.

There is strong potential for capacity builders to help local governments and regulated industries effectively participate in China's carbon market, including national government actors, consultancies, and international organizations.

In order for China to scale up a national carbon market to meet its original scope and emissions reduction goals, three things have to occur: emssions accounting must be standardized, capacity building organizations must engage with reporting entities so that emissions data is transparent and accurate, and policymakers must confont the issue of market structure in China's electric power sector, with the long-term goal of reforming and degregulating the sector.

1. The Carbon Market and Market-Based Environmental Regulation in China

China exceeds all other countries in annual energy use and greenhouse gas emissions.[1] For the past several years, China has been working to design and implement a carbon dioxide emissions trading system, or carbon market, to reduce the country's CO2 emissions. The carbon market is one of the most significant of China's suite of clean energy and climate policies over the past decade in terms of scope and political visibility.

However, this form of policy—a market-based mechanism—is a notable paradox in the context of environmental regulation in China. Energy and environmental regulation in China has typically taken the form of command-and-control policies, such as pollution levies and forced shutdowns of polluting facilities.[2] In the past ten years, as the scope and stringency of environmental regulation in

China has increased, so have the costs, which typically fall on local economies.[3] As a result, environmental regulators in China have become more receptive to market-based approaches, which can theoretically achieve emissions reductions at lower cost and allow firms more flexibility in complying with regulations.

Previously, China piloted a sulfur dioxide emissions trading system in the 1990s, but it never became an institutionalized policy in the provinces that were supposed to adopt it, and was not regarded as a success.[4] Starting in 2011, China established seven provincial and municipal carbon market pilots around the country that varied in their design elements as a step towards a national system.[5] The carbon market pilots have faced challenges in enforcing compliance while maintaining a robust carbon price, though some have been more successful than others.[6]

The electric power sector—the first sector China's national carbon market proposes to regulate—poses a major challenge for the design and efficacy of the carbon market policy. China's wholesale electricity markets, which are regionally managed, are not competitive in structure, meaning that the marginal cost of producing electricity does not determine the electricity price or the dispatch order for power generators. Thus, a carbon price imposed by the carbon market will not affect generator or end-user behavior by proportionally making more carbon-intensive generation more expensive, as is intended by the theoretical policy design.

In order to pass on the carbon price to electricity consumers, several of China's carbon market pilots require that large consumers of electricity must purchase and retire allowances for the electricity they consume, though this may not be as effective as power sector reform, an ongoing process in China.[7] While China's carbon market policymakers are working on a cost pass-through mechanism for applying a carbon price to power generators for the national carbon market, the structure of China's electricity market will hamper effectiveness of carbon pricing, and progress to mitigate this problem has been slow. One solution under consideration is to regulate large electricity consumers as well as generators, but this could create issues with double counting and distort the carbon price signal.

At the same time, some scholars have argued that the concept of a carbon market—especially the idea that participation could lower the cost of regulation for firms—is not well understood by provincial governments and actors in China, who are used to command-and-control regulation.[8] Given the incomplete regulatory infrastructure and ongoing government intervention in pilot carbon markets, the national carbon market has many challenges to face at its outset.

This fundamental challenge in market structure has led to the characterization of China's carbon market as a paradox:

> *"On the one hand, [the carbon market] is perceived to rest on the power of the state rather than the market. On the other hand, it is also expected to reform China's 'command-and-control' environmental governance system."*[9]

This language of tension, dilemma, and paradox characterizes much of the political economic literature on China's carbon market. While such tension certainly exists, it is also important to look at China's carbon market not just as a policy instrument, but also as a policy process. Viewing it as a process reveals significant opportunities that have arisen for capacity building to align actors and standardize emissions accounting processes. Below we explore an understudied challenge—emissions accounting—as well as the opportunities that have arisen in the first phase of China's national carbon market.

2. Challenges with Emissions Monitoring, Reporting, and Verification

China's national carbon market was originally supposed to begin in 2017, according to earlier high-profile and high-level statements, such as the U.S.-China Joint Presidential Statement on Climate Change between President Obama and Xi Jinping. Although the national carbon market was officially launched at the end of 2017, no actual trading activity occurred at the national level as was anticipated. The launch of the carbon market was instead divided into phases, with the first phase focusing on foundation building (基础建设期).

In addition to a shifting timeline for the onset of actual carbon trading at the national level, there has also been a narrowing of scope of the policy. The number of sectors that an emissions trading system covers plays a large role in the overall cost of mitigating the cost of those emissions, and is thus an important design element for the national carbon market.[10] However, the proposed sectors to be covered by China's national carbon market have been successively reduced since the initial draft plan by the NDRC in January 2016. Earlier policy documents suggested that China's carbon market was going to cover 14 sectors. The January 2016 NDRC draft plan for the national carbon market proposed covering 8 sectors: electricity, chemicals, iron and steel, cement, metallurgy, papermaking, aviation, and building materials.[11] In May 2017, draft plans for just three sectors were released: electricity, cement, and metallurgy.[12] As of now, the national carbon market will only cover

one sector, the electric power sector, which has the most complete emissions data. Other sectors are meant to eventually be phased in, but the stated ambition has significantly changed.

Even as the scope of the policy has narrowed and the timeline has shifted, China's state investment and political commitment to the national carbon market are expanding. These investments of political capital and monetary resources have focused on improving monitoring, reporting, and verification (MRV) through capacity building.

The first step in establishing a carbon market is collecting information about the enterprises to be regulated. According to economic theory, markets rely on information. Transparent information allows market participants to settle on efficient prices. Greenhouse gas emissions accounting is thus a fundamental part of global climate policy—specifically, trustworthy accounting of emissions at the national and subnational levels to enable policy formulation and evaluation.

China has faced past challenges in energy and emissions reporting. In 2015, the National Bureau of Statistics was accused of underreporting coal consumption by around 17%.[13] In 2012, an international team of researchers from China, the UK, and the U.S. found a massive discrepancy between national and provincial datasets on energy use in China, which form the basis for estimating carbon dioxide emissions.[14] The national-level emissions, which should have been equal to the sum of the provincial data, were in fact 20% lower in the 2010 inventory. This discrepancy amounted to 1.4 gigatons of carbon dioxide, or 5% of the world's total emissions that year. The researchers identified this discrepancy as stemming from small coal producers that only reported to provincial authorities, as well as systematic under-reporting from provincial to national authorities. In light of this discrepancy, the national government recently updated historical statistics on coal use, a significant upwards revision.[15]

For carbon markets, the most essential data for regulation are firm-level carbon dioxide emissions, in connection with which MRV must be performed each year as part of the regulatory process. Emissions accounting and MRV allow policymakers to track progress, enforce regulation, and determine the size of the market (i.e. how many allowances will be traded). Proper emissions accounting is especially important given the complex design of China's carbon market, which is a set of tradable performance standards that will require careful standardization within and across sectors.[16]

The threshold for a power plant's inclusion in China's national carbon market is emitting more than 26,000 tons of greenhouse gases (CO_2e) or consuming more than 10,000 tons of coal equivalent (tce) per year. This applies to electricity generating industries (发电行业), enterprises (企业), and economic organizations (经济组织), as well as other sectors with electric power plants on-site (其他行业自备电厂).[17] About 1,700 power plants nationwide are above this threshold and will be covered by

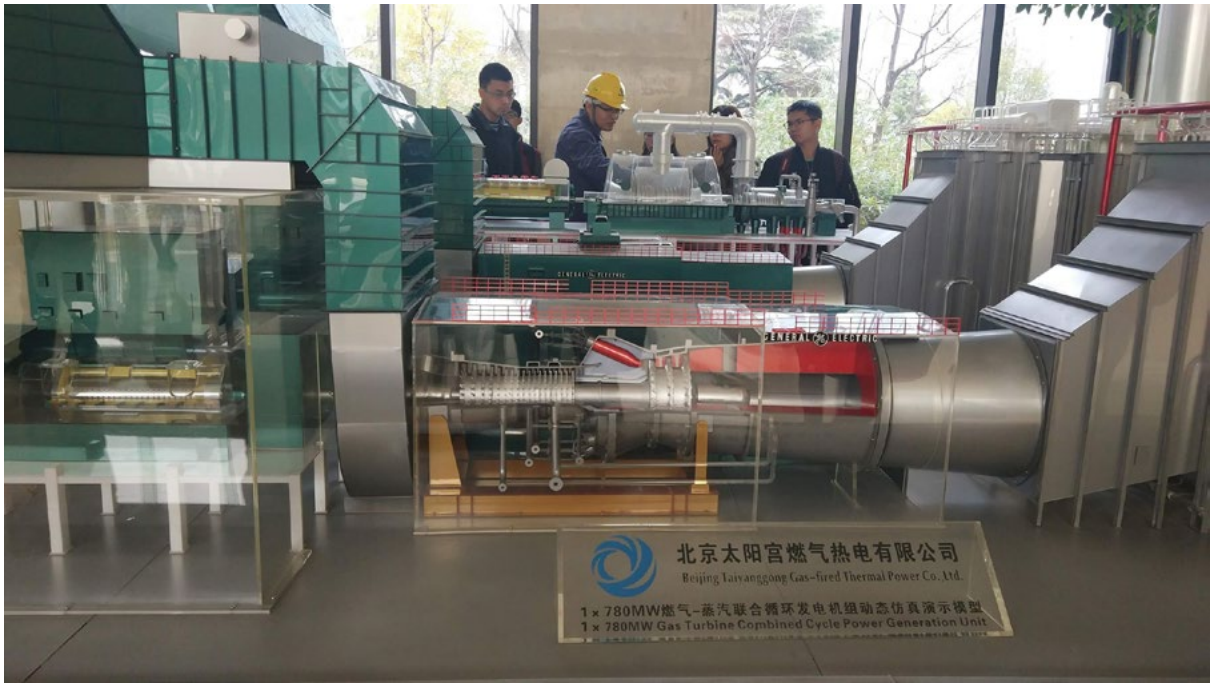
the national carbon market.[18] For now, this means that they are required to submit data on their emissions to their provincial or municipal governments, which then validate and report this information to the national Ministry of Environment and Ecology (MEE). Two separate third-party verifiers, as organized by the provincial or municipal governments, audit the emissions data for each plant. The MEE also strictly controls access to the emissions data, which is at odds with the need for transparent information to facilitate a competitive market. Local emissions exchanges, however, which handle actual trading for the pilot carbon markets, have daily data on transactions in the pilots.

Although the power sector is the first sector being covered by the national carbon market, China has collected annual emissions data from some to-be regulated sectors for several years. In the past, emissions data were unreliable, and energy and emissions data didn't match (as the previously discussed "gigaton gap" report found), so the ongoing process of collecting this data is meant to establish a correct baseline for the carbon market. In 2012, the NDRC first published guidelines for enterprises to account for and report their emissions, which were used to collect data from enterprises in 24 industrial sectors across China in 2013, 2014, and 2015. These basic guidelines were further clarified and expanded in the NDRC's 2014 "Interim Measures on the Administration of Carbon Emissions Trading" for MRV, and a further notice in 2016 that had more detailed reporting and verification requirements for the already-collected data from 2013 to 2015. These later policies required enterprises to come up with an emissions monitoring plan to be approved by local officials, which is meant to guide the annual reporting process. In 2016, provincial and municipal governments began to verify the 2013-2015 emissions accounts. Together these documents form the legal framework for the national carbon market and lay out the basic MRV requirements, although there is concern about lack of clarity in some of the calculations and requirements.[19]

A lack of legal force is a significant problem, as emissions accounting at the local level is often complicated by the close relationships between provincial governments and the enterprises in their jurisdictions. China is a vastly diverse country, and provinces differ dramatically in their level of economic development. A national carbon market would, in theory, require a uniform regulation across the country, but local governments have been pushing back about key aspects of the national carbon market, including reporting requirements and timeline, on behalf of their jurisdictions.

Given the shifting timeline and scope of the national carbon market, policymakers have made it clear that more complete and accurate emissions inventories from regulated sectors are needed in order to design key features and expand the scope of the national carbon market. In fact, the creation of emissions inventories is likely a major reason for the shifting timeline of the national carbon market. Thus, many capacity building efforts in China focus on enabling firms and their regulators to complete the MRV process.

3. An Opportunity for Capacity Building



An engineer at the Taiyanggong natural gas power plant in Beijing, which is regulated under Beijing's pilot carbon market, leads a study tour for local students (photo from October 2018, author's own).

Like any market, the carbon market comes to fruition when all its participants adhere to standard accounting processes to exchange a uniform commodity (i.e. CO2 emissions). In general, capacity building problematizes the lack of capacity of various stakeholders.[20] In the case of China's carbon market, local governments and regulated companies are perceived as the entities most in need of capacity building to participate adequately in the carbon market. This creates the opportunity for the capacity builders to share their knowledge and harmonize their vision for the market. Below we discuss the roles of several different capacity builders in China's carbon market: government, consultancies, and international organizations.

Government: The national-level government actors in charge of the carbon market have spent significantly on capacity building efforts. First, there is the direct cost of subsidies for emissions verification services, trainings and workshops for local government officials, and so on. Second, a recent shift in bureaucratic structure has significantly slowed the onset of actual trading. When responsibility for carbon markets was transferred from the NDRC to the MEE at the national level, a similar shift had to happen for local governments, with local Environmental Protection Bureaus, re-named as Bureaus of Environment and Ecology (BEEs), taking over from the local DRCs. While some personnel from the local DRCs moved to the local BEEs to continue working on the carbon market, many did not. This shift has been described in terms of cost, waste, and loss of capacity, but

from another angle, it means there is a continued opportunity for capacity building services. The restructuring has led to an even greater need for capacity building among local government officials.

Consultancies: Consultancies can be thought of as the brokers who organize trainings for local governments and regulated companies on the part of the funders—national government and international organizations. Consultancies run trainings themselves as well as arrange for external experts, especially from universities, to assist with the trainings. These consultancies, defined by being paid for their capacity building services, vary—from small to large companies, Chinese and international. Many of them, such as Sinocarbon, a large domestic consultancy, also provide MRV services. With the announcement of the first phase of the carbon market as a foundation-building phase, consulting companies have increasingly framed their services as capacity building, an attractive term for a range of international and domestic funders.

International Organizations: There are roughly two types of international organizations engaged in capacity building for China's carbon markets: international consultancies or NGOs that provide capacity building services, and international financiers, which may channel finance for capacity building through other organizations or may directly provide capacity building services themselves. Most financiers are national or subnational governments where there are already operating carbon markets—unsurprisingly, most financiers are European, given that the EU has many years of experience with its own carbon market. Some international organizations or research institutes also provide finance for capacity building. The European Union, Germany, and Norway are the largest governmental funders, while the World Bank's Partnership for Market Readiness (PMR) "has the largest single project in financial terms, with a budget of $8 million".[21] International consultancies like Ecofys and ICF International have been involved with both the pilots and the national carbon market, often sub-contracted by the aforementioned agencies. This flow of international funding, in addition to domestic funding from China's national government, has created many opportunities for a diverse range of capacity building organizations.

4. Policy Implications

Overall, China's national carbon market is facing a significant number of challenges in moving towards carbon trading at the national level, and it is still unclear whether or not China can successfully overcome these problems. This policy brief has provided an overview of how emissions data is collected for China's carbon market, demonstrating why it is such a difficult yet fundamental process.

Facing these challenges, national policymakers have instead focused on capacity building as the first phase of the national carbon market. Before actual trading can occur, data collection must be standardized, experts cultivated, and trainings conducted. Doing so will build the foundation of a proper market—transparent and accurate information.

However, this important work still does not address ongoing fundamental issues in the design of China's carbon market. The scale-up and expansion of China's national carbon market will require policymakers to address the issue of market structure in China's electric power sector, discussed in the first section of this brief. This could be done through well-enforced cost pass-through mechanisms in the short term, and reform and deregulation of China's electric power sector in the longer term. In addition, the carbon market will need to be expanded to other large electricity consumers and other major emitting sectors in order to meet its original scope and emissions reduction goals. Only then will China's carbon market have the potential to be an effective market-based regulation.

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