CARBON EMISSIONS DEVELOPMENT IN CHINA

In 2011, China chose to apply emissions trading as one of the major approaches to decarbonize its electricity sector, recognizing the scale of the challenges of its fast-growing electricity demand and reliance on coal. Piloting emissions trading in selected regions and sectors is the first step in achieving the goal of scaling up to a nation-wide program. China's emissions trading pilot programs are significant in terms of the size of covered emission and provide many valuable lessons. In this article, the authors argue that in long run, electricity market reforms need to be developed in line with the carbon market. They demonstrate that while improvements need to be made to China's emissions trading system, Turkey can still draw important lessons from it.

Maosheng Duan, Qian Wu, Xi Liang, Jin Li, Alpay Beyla, & Rıza Kadılar*

TURKISH POLICY QUARTERLY
Summer 2015

* Dr. Rıza Kadılar is a senior international investment banker. He leads various non-profit organizations, including China Institute Turkey, where he serves as founding chairman. Dr. Maosheng Duan is a professor from Tsinghua University, China. He has been a member of the Kyoto Protocol's Clean Development Mechanism Executive Board since 2010. Qian Wu is an experienced policy analyst of carbon markets, renewable energy, and industrial energy efficiency. Dr. Xi Liang is Director of Centre for Business and Climate Change at the University of Edinburgh, UK. Dr. Jin Li is the assistant manager of Shanghai Environment and Energy Exchange. Alpay Beyla is currently working on developing financial models on emission reduction projects such as renewable energy and energy efficiency projects.

Despite challenges, China is the first developing country already utilizing a cap-and-trade mechanism for emissions reductions in its energy-intensive sectors in selected regions. Turkey is also considering emissions trading in its own energy sector. China's experience in developing policy strategies for a carbon-constraint future could be relevant to Turkey. There are useful lessons to be drawn from Chinese emissions-trading scheme (ETS) pilots in sector coverage, market design, resource allocation, and monitoring and reporting systems.

China's electricity sector accounts for one-third of the country's overall carbon emissions, making it the country's single-largest source of such emissions. "Command-and-control" was the primary approach used for reducing emissions in the electricity sector during the 11th Five-Year Plan period (2006-10). A typical policy was referred to as "replacing small units by large units," forcing the shut-down of small and inefficient coal-fired power plants of up to 70 Gigawatt (GW). In this respect, the Turkish economy shows similar characteristics. Fossil fuels representing about 60 percent of Turkey's primary energy needs are almost fully imported. Out of 62 Megawatt (MW) of installed capacity for electricity production, almost 40 MW is coal- and gas-fired power plants; only 2.6 MW comes from wind, solar, and geothermal sources. On the other hand, Turkey's energy consumption is almost equally divided between industry, residential living, and transportation. Thus, Turkey's primary energy needs, and especially its electricity production, depend heavily on fossil fuels, and represent a major obstacle for a smooth low-carbon transition of its economy.

China's power generation capacity reached 5.64 trillion kWh in 2014. About 74.9 percent of this came from thermal power generation (three-quarters of it from burning coal), with the consumption of 1.96 billion tons of coal releasing more than 3.55 gigatonnes of carbon dioxide (GtCO2).[1] It is estimated that electricity consumption in the period of 2016-20 will reach 11.2 billion tons of coal, generating approximately 20.3 GtCO2.

Decarbonizing power generation should be a central focus if mitigation targets are to be met. The Chinese government recognized the need to create incentives to drive electricity savings as well as advance emissions reductions, and a debate about the application of emission-trading regulations to the electricity sector was initiated. The main argument from China's power companies was that they would have to bear all the costs because of the controlled price of electricity, while the counter-argument was that the emission permits would initially be allocated for free.

1 "Analyzed Data from China National Energy Administration," *National Development and Reform Commission*, http://en.ndrc.gov.cn/

To avoid confronting industry heavy-hitters such as large energy companies, China started piloting emissions-trading policies at the regional, instead of the sectorial, level. The Chinese government decided to formulate seven ETS pilots, then asked local governments to select the sectors suitable for their ETSs. As a result, power companies with significant carbon emissions (usually above a certain threshold) have to participate in the ETS pilots, in which they must accept a limit on carbon emissions and are required to comply with reporting standards.

"Turkey's primary energy needs, and especially its electricity production, depend heavily on fossil fuels, and represent a major obstacle for a smooth low-carbon transition of its economy."

"Grand-fathering" – free allocation based on historical emissions – is the primary approach to allocation. Benchmarks based on emissions performance are also developed to allocate emission allowances in some sectors such as the electricity sector. It is expected that fewer and fewer free allowances will be granted in the future. The Chinese ETS also covers "indirect emissions," which are calculated based on the electricity usage by large manufacturing plants or utilities. The cement, iron, steel, and chemical sectors are also covered by the ETS pilots.

Carbon-trading systems have been taking shape since 2013 in seven Chinese regions. Within the next three years, the pilots will continue to operate as small-scale functioning markets, while the government develops the necessary infrastructure that would lead to a scaled-up national carbon market by 2020. In total, these pilots cover about 1.25 GtCO2 per year from over 2,000 entities. So far the seven pilots are operating smoothly with a high compliance rate (99 percent).

Carbon Pricing in China's Pilot ETSs

Carbon prices in the Chinese ETS pilot programs are largely driven by non-market forces, such as local governments or companies covered in the ETS which hold a large amount of emission allowances. These carbon prices have no connection with each other because the pilots are independently operated. The fact that carbon prices vary significantly (3.3 dollars/tCO2 – 8.8 dollars/tCO2 in 2014) amongst the different Chinese ETSs poses challenges for the government in understanding carbon pricing in the context of a national ETS. China is concerned that a very high carbon price may hamper economic growth; conversely, the market may fall apart if the prices are too low or collapse altogether.

In the European Union's ETS, electricity prices in the member states are relatively liberalized, so power companies can set their retail prices higher (to certain extent) to compensate for their additional costs of reducing carbon emissions. This is often called the "pass-through ability," and is an effective way to reflect the intrinsic value of power generation.

"To avoid confronting industry heavy-hitters such as large energy companies, China started piloting emissions-trading policies at the regional, instead of the sectorial, level."

Unfortunately this is not the case in China due to electricity price controls, which discourage power companies from imposing ambitious mitigation targets or adapting low-carbon technologies. Such controls are likely to hinder the abatement potential that should have been the result of the emissions-trading policy. A recent Chinese study shows that in the absence of the necessary response measures, price controls in general will lead to an 18 to 32 percent decline in the operating efficiency of the carbon market, because carbon costs are not well reflected in the price of electricity.[2]

In the past 10 years, China has tried to push electricity market reforms. The key measures are benchmarking prices for different provinces or regions, linking electricity prices with coal prices, and tiered pricing for household electricity. The ultimate objective is to introduce competition into both wholesale and retail markets, and to gradually allow the prices to be more responsive to the market. However, this reform has been carried out slowly and electricity pricing is still highly regulated. Moreover, China also regulates indirect emissions in other industries – mainly from electricity consumption – as a temporary measure during the pilot phase. Moving forward, the relationship between the carbon and electricity markets needs to be further assessed and issues of accounting and coverage need to be reformed. This is particularly important when reforms in the energy market are lagging behind the development of the carbon market.

In order to make carbon trading work, it is important to build basic market conditions and remove electricity price controls that could undermine the effectiveness of the ETS. Electricity market reform can potentially benefit from the development of a national ETS by creating competition in generating clean power at a lower

2 Zhang Li et al., "Developing China's National Carbon Market in Coordination with the Electricity Market," *State Information Centre, the National Development and Reform Commission*, October 2014.

cost. However, the ETS should be designed in coordination with the liberalization of electricity prices. Covering indirect emissions in the Chinese ETS pilots is an interim measure; further electricity price reforms, together with power company allocation plans, are needed.

Prospects for a Turkish ETS

With rapidly-growing electricity consumption and incentives offered for fossil fuel electricity generation, CO2 emissions from the electricity sector in Turkey have tripled over the last two decades. It is critical that climate policy be integrated into energy policy, which has focused so far on energy security and resources. Developing an ETS in Turkey will create incentives for deploying carbon-reduction technologies and business models.

For industries, it is better to prepare early. Initial steps include measuring their greenhouse gas (GHG) emissions, identifying their mitigation potential and costs, and comparing GHG-emitting performance with their competitors. This preparation will facilitate quick and informed decisions by industries when related governmental policies arise, and position those industries well in discussions with the government.

China has a lot to share with Turkey in terms of willingness to act and selecting the appropriate policy tools for low-carbon development. Setting up emissions-trading schemes through pilot programs in line with an intensity-based emission reduction target is a good example. Introducing a mandatory GHG-reporting system for big emitters is fundamental. Continued interaction and communication among stakeholders in Turkish and Chinese carbon markets will create mutual understanding and add value to both future systems. In this regard, it is highly recommended that an independent platform with strong links among state and private sector institutions be established in both countries to ensure sustainable dialogue, mutual understanding, and efficient cooperation on climate policy and institutional solutions.