The Emissions Trading Scheme Design under the Renewable Energy Sources Policy in China

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In the Intended Nationally Determined Contribution (INDC) submitted to the United Nations Framework Convention on Climate Change (UNFCCC) in June 2015, the Chinese Government announced its intention to cut CO2 emissions by 60%â€“65% per unit of GDP by 2030 compared to 2005 levels, and for 20% of total energy consumption to be derived from non-fossil sources by 2030. To achieve both the emissions reduction targets and renewable energy promotion target, the emissions trading scheme (ETS) and renewable energy sources (RES) policies have been considered two essential market-based instruments in China. While the RES policy was adopted since 2016, the ETS in China is in the form of seven pilots in the present. A nationwide carbon market is going to be implemented in 2017, which aims to reduce CO2 emissions effectively. Since the main power generation remains the coal-powered generation in China, the ETS policy will bring higher costs for fossil-derived generation and thus lead to the substitution of renewable energy for fossil energy. At the same time, the RES policy is targeted to increase the renewable energy usage, which overlaps with the ETS policy. Therefore, the combination of ETS and RES policies raises an important issue: What is the effect of the co-existed ETS and RES policies on energy structure and regional economies in China? How to design the nationwide carbon market effectively considering the RES policy in China? This study answers these questions using a multi-regional computable general equilibrium (CGE) model in China, which is able to capture the economy-wide impacts. Focusing on the design of the nationwide carbon market, this paper analyses the economic impacts of ETS in combination with RES policies in China.

Six policy scenarios are set for the implementation of ETS and RES policies in the paper: a nationwide carbon market alone; and five scenarios for the combination of ETS and RES policies with a FIT subsidy ranging from 20% to 100%. The results show that the CO2 price in the nationwide carbon market would decrease by 11%â€“64% with increasing renewable energy subsidies, thereby is disincentive to low-carbon investment. At the same time, the total trading volume of ETS is predicted to decrease by 3%â€“25%. Secondly, combining a FIT with an ETS imposes additional GDP cost and welfare loss in all regions, thereby increasing the cost of the policy by 0.01%â€“0.06%. Eastern regions, which have higher abatement costs and lower potential for developing renewable energy, face more significant social costs under the combined ETS and RES policies than with ETS alone. Lastly, the electricity industry faces a decline in total output; however, it experiences less reduction of CO2 emissions and decline in CO2 intensity under the combination of ETS and RES policies than with ETS alone. In conclusion, as the implementation of the nationwide carbon market is imminent, policymakers should not ignore the economic impacts of the overlap between ETS and RES policies in China.