

Summary: Impact assessment of Carbon emission trading Scheme in Guangdong China

Daiqing Zhao, Peng Wang, Hangeheng Dai

Guangzhou Institute of Energy Conversion, Chinese Academy Sciences,

Guangdong Carbon Emission Trading System (GD-ETS) is one of seven Chinese pilot carbon emission trading systems, which is also the biggest carbon markets in China. GD-ETS is preliminarily constructed for four energy-intensive sectors: cement, power plant, steel, and petrochemical industries, covered about 50% carbon emission of Guangdong total emission in 2013. Up to now, GD-ETS has operating for more than 1 year since it launched in 2013, it's the right time to estimate the impact of GD-ETS on macro-economy, employment, enterprise competitiveness, etc. Our institute and NIES work together exploring a two-region dynamic CGE model for evaluating the effect of both policies of emission constraint and ETS mechanism on the economy of Guangdong. The research group took the Copenhagen emission reduction target towards 2020a as constraint condition of CGE model, and designed five scenarios, including one reference case (BAU), two cases (which under different carbon emission constraints without trading system), and other two cases (which under emission constraints with trading system). The simulation results show that carbon price and economic impacts of ETS are closely related to both the degree of tightness of emission cap and whether trading system exist. In the scenario that with surpass 45% emission reduction target but no trading system, carbon mitigation cost of refinery and iron & steel sectors would be relatively higher whereas that of power and cement sectors would be lower, the carbon price of the four sector is 1-150 USD /ton-CO₂ and the GDP loss would be 1.4%. On the contrary, in the scenario with trading system, the carbon price would be \$38/ton-CO₂, creating a carbon market of around 1 billion USD. Furthermore, ETS could significantly reduce the mitigation cost for the whole economy. The GDP of Guangdong province would recover by 2.6 billion USD. In addition, the economic output and employment of sectors with would be affected compared to the scenario without ETS. The analysis would provide the supportive evidence about how to set sector emission caps on different situation.

Based on the result, the research group has proposed several options to Guangdong government for adjusting GD-ETS in order to restore the structural balance between supply and demand of allowances, and to re-establish the role of the carbon price in encouraging low carbon investment. Most of these suggestions have been adopted by Guangdong government and taken into the official document "Guangdong's emission allowance adjustment rule in 2014", which has published on August 26, 2014.