

Peaking China's carbon emissions by 2030: the key options and economic impacts

Abstract

This study investigates the options and sectors that are essential for China to achieve carbon emissions peak by 2030. A dynamic computable general equilibrium (CGE) model is used to generate 14 scenarios from a scenario matrix incorporating three levels of carbon constraints and four options of low-carbon measures. Results suggest that if there is no policy intervention China's total CO₂ emissions would reach 22.9 Gt in 2030. To cut carbon emissions required by the latest Intended Nationally Determined Contributions (INDC) or the global 2-degree target, China should not only rely on optimizing industry structure or restricting its industry output, but more importantly, it should rely on low-carbon technologies in the power and end-use sectors as well as low-carbon style consumption. We also depict how the mitigation costs can be lowered through various low-carbon countermeasures, with which the carbon mitigation cost of achieving China's INDC target in 2030 could be reduced from 155 USD/ton-CO₂ to 35 USD/ton-CO₂. The corresponding GDP loss could fall from 6.3% to merely 0.67%, and welfare will not be affected significantly. Moreover, remarkable co-benefits will be achieved such as improvement in air quality and energy security.

Key words: carbon emissions peak; computable general equilibrium model; INDC (Intended Nationally Determined Contributions); China

Highlight of this paper

- ✧ Assessing China's climate mitigation policy using a CGE model
- ✧ Identifying the key options and sectors for China to achieve carbon emissions peak by 2030.
- ✧ Assessing the economic cost of carbon reduction
- ✧ Quantifying the co-benefits of improvement in air quality and energy security