

Interactions between mitigation policies delay the achievement of carbon neutrality in China

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Achieving carbon neutrality in China is crucial for meeting the 1.5°C target outlined in the Paris Agreement, and optimizing emission reduction strategies is key to China's response to climate change. Existing studies propose various carbon neutrality policies, yet this attempt is hampered by poor knowledge on interactions between mitigation policies. To address this gap, this study uses a dynamic computable general equilibrium model of China (CEEAGE model), and creates a policy portfolio area of 1,295 scenarios covering four major mitigation strategies (carbon pricing, energy efficiency, renewable energy, and electrification of end-uses). We find that this reveals the synergistic feedback mechanisms among carbon reduction policies and their impact on achieving carbon neutrality. When the interplays between mitigation policies are considered, the percentage of scenarios achieving carbon neutrality target by 2060 decreases by 84%, with the achieving years of these scenarios delayed by 5-6 years. Only the combinations of renewable energy and electrification of end-uses policies generate synergistic effects in both economic and mitigation impacts. The combinations of carbon pricing and renewable energy policies exhibit the greatest trade-offs, significantly weakening emission reductions and enlarging economic losses. This study highlights the importance of considering policy interactions and provides valuable insights for formulating effective carbon reduction strategies for China and other countries.