TRANSITION PATHWAY TOWARDS CHINA'S LOW-CARBON ENERGY ECONOMY

Yuyan Weng, Tsinghua University, Phone +86 13401184213, E-mail: wengyy12@mails.tsinghua.edu.cn
Xiliang Zhang, Tsinghua University, Phone +86 13488713311, E-mail: zhang_xl@mail.tsinghua.edu.cn
Tianyu Qi, The Boston Consulting Group, Phone +86 13911261226, E-mail: apollo110110@gmail.com

Overview

China is the largest developing country in the world, which is right in the stage of rapid development of industrialization and urbanization. It is facing multiple challenges of economic transformation, environmental protection and climate change. At the same time, as the largest contributor of global emissions, China's future capability of emission mitigation is widely concerned by the world. During the past many years, China has regarded the issue of climate change as a major national economic and social development strategy, and has taken a series of active actions. Since the "Eleventh Five-Year" Plan Period, the implementation of energy saving and emission reduction policies accelerates a substantial increase in energy efficiency, making an annual average decline rate of nearly 5% in carbon emissions per unit of Gross Domestic Product (GDP). In 2015, China announced its Intended Nationally Determined Contribution (INDC) target before the Paris conference, which committed to achieve the peaking of carbon dioxide emissions around 2030 and make best efforts to peak early. In achieving this target, China intends to lower its carbon dioxide emissions per unit of GDP by 60% to 65% from the 2005 level, and increase the share of non-fossil fuels in primary energy consumption to around 20%. In order to fulfil this commitment, China's energy and economic systems need deep low-carbon transition. The paper tries to conduct the quantitative analysis of the transition pathway and policies towards a low-carbon energy economy under different scenarios by deploying the China - Global Energy Model (C-GEM), and evaluate the direct impact of transition on social welfare.

The paper is organised as follows: After the introduction the second section gives a brief overview about the history of China's carbon intensity of GDP. The third section addresses the model and data applied in this analysis. In section four we describe the designed scenarios and the model results. In the final section conclusions and policy implications are derived.

Methods

In this paper, China - Global Energy Model (C-GEM) is used to anaylyze the transition pathway of China's low-carbon energy economy. The China-in-Global Energy Model (C-GEM) is a multiregional, multi-sector, recursive–dynamic, computable general equilibrium (CGE) model of the global economy. The primary goal of the model is to analyze the impact of existing and proposed energy and climate polices in China on technology, inter-fuel competition, the environment, and the economy within a global context.

Results

Three scenarios are designed to simulate China's low-carbon energy economy transition pathways.

With great efforts and at a certain level of carbon price, China's carbon dioxide are expected to reach the peak early, achieving China's commitment in advance.

Although China's low-carbon transition will exert some impact on its economy, the economic cost is relatively low.

Conclusions

Our analysis shows a remarkable change in the trend of primary energy consumption and carbon dioxide emissions pathway under different scenarios. On the other hand, the impacts of low-carbon transition on social welfare are under control. And if considering the synergies of the reduction of coal consumption, such as the effects of reduction of air pollution on the health, the welfare losses will further be offset. However, China's low-carbon transition can not be realized spontaneously. In addition to the promotion of renewable energy and natural gas utilization, carbon price mechanism should also be introduced.

References

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