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## Toward an optimal co-benefit between energy security and carbon mitigation in China: A policy roadmap

Shuai Zhong, Lei Shen, Jianan Zhao and Limao Wang  
University of Chinese Academy of Sciences, China

From a policy perspective, the differences between the objectives of energy security (ES) and carbon mitigation (CM) are evident but related. In this study, we conducted a literature analysis to evaluate available policies around the world with focus on ES and CM. The analysis verified the findings that many policies have huge co-benefits potential, but we also found the conflicts in different cases of certain polices (Figure 1). As the conflicts become more significant and serious, 'policy mix' by taking various measures with a better planning is proposed to bring co-benefits between ES and CM. The findings indicate the necessity to design a policy roadmap integrated with an optimal policy mix, and the computable general equilibrium (CGE) framework has distinct advantages in the areas of policy analysis. Taking China as a case, we obtained this policy roadmap by establishing a multi-objective optimization model and it propose the best solution for improving energy saving and carbon abatement compared to single-objective optimization models. Furthermore, the different values of energy consumption peaks and carbon emission peaks were projected for 2016-2050 under different policy scenarios equipped with various policy mixes. We set the year 2030 as the timeline to define the multiple stages with different priorities in policy objectives: before 2030, policy objective would give priority to economic development; around 2030, policy objective would give priority to peaking carbon emission and reducing carbon intensity by 60-65% (compared to 2005 level); after 2030, policy objective would give priority to economic restructure with sustainable energy supply for supporting the post-industrialization. The comparative analysis on these policy scenarios not only provided an optimal interval for energy supply, but also estimated the highest, optimal and lowest levels of carbon emission peaks, respectively, through evaluating the effects derived from different policy scenarios.

### Biography

Shuai Zhong is currently an Assistant Professor in resources economics and policy in Institute of Geographic Sciences and Natural Resources Research (IGSNRR), Chinese Academy of Sciences (CAS). He has contributed to the research on energy security, carbon emission mitigation in cement production, resources-based city transformation and water pricing and management by applying computable general equilibrium (CGE) model. He has made some contributions to CGE analysis by focusing on the issues from multi-regional and dynamic perspectives, such as the optimal allocation of regional resources with a long-term planning.

zhongshuai@igsnr.ac.cn

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